The Builder.

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ILLUSTRATIONS.

View of Glasgow Municipal Buildings: John-street Front.—The late Mr. William Young, F.R.I.B.A., Architect.. *Extra Large Ink-Photo.*
House at Chislehurst: Entrance Front.—Mr. Ernest Newton, Architect ..... *Double-Page Photo-Litho.*
Sculpture, Pares's Bank, Leicester: "Commerce" and "Agriculture."—Mr. C. J. Allen, Sculptor..... *Two Single-Page Ink-Photos.*

Blocks in Text.

To the Younger Generation:—
Inigo Jones's Plan for Whitehall Palace ..... Page 355
Part of the Whitehall Plan to a Larger Scale ..... Page 357
To the Younger Generation (continued):—
Diagrams Illustrating Plan for House..... Page 358
Illustrations to Student's Column ..... Page 369

CONTENTS.

The Ideal of the Modern Cathedral 353
To the Younger Generation 354
Notes..... 358
The Sanitary Institute 360
Architectural Association Discussion Section 362
A Model Building Trades' School 363
Illustrations:—
Municipal Buildings, Glasgow..... 364
House at Chislehurst 364
Sculpture Panels, Pares's Bank, Leicester 364
The London County Council 363
Stables and Stable Fittings..... 364
Architectural Societies 366
Tribunal of Appeal Case 366
Applications under the London Building Act 367
The Grove Vale Depôt 367
Correspondence:—
"Lux-Calor" Stoves 368
Books Received 368
The Student's Column.—Gas and Gas Fittings—17..... 368
Obituary 369
General Building News 369
Sanitary and Engineering News 370
Stained Glass and Decoration 371
Foreign 371
Miscellaneous 371
Recent Patents 372
Meetings 373
Some Recent Sales of Property 373
Prices Current of Materials 373

The Ideal of the Modern Cathedral.

THE correspondence which has been going on in the *Times* in regard to the proposed Liverpool Cathedral—clenched as it was (we were glad to see) by a really admirable leading article in the same journal—must surely by this time have convinced even the fossil minds of the Liverpool Cathedral Committee that they have made a blunder, and even come near to making themselves a laughing-stock, in their obsolete demand for a copy of a mediæval cathedral, and in the reasons they give for it. It is quite true that the reasoning they employ is only what was in common use half a century ago; it is the reasoning of the Camden Ecclesiological Society resuscitated. But while the artistic world has moved away from that position—has recognised that the Gothic revival, however admirable in its enthusiasm, was mistaken in its practice, and only succeeded in giving us a legacy of sham mediævalism without life or reality in it, the minds of Mr. Robert Gladstone and his colleagues seem to have remained just where the Camden Society was half a century ago. So much so is this the case, that they apparently cannot even understand the existence of any architecture other than imitation; and when Mr. Blomfield exhorts them not to demand an imitation mediæval cathedral, they cannot even understand his argument, and reply in effect—"What, then, are we to imitate?"

It is not worth while to labour this question further in these pages; most of our readers understand the position well enough, at all events, and know what is the meaning of the protest which has been raised against the antiquated proposals of the Liverpool Cathedral Committee. But apart from the mere question of architectural style which affects all important modern buildings equally, there is the question which may be put more particularly with reference to a modern cathedral: What is it we want in such a building, or what ought we to want? What is or should be our ideal in connexion with it?

Nearly all our mediæval cathedrals were originally built as a portion only of a great clerical institution which, though, it has its survivals, no longer exists as a part of our national life or of our national Church. They were each centres of a great monastic establishment, and were built for a worship carried on by the clerics in the choir, and not partaken in by the laity. The long nave was nearly useless except for occasional processions, but its grandeur, and that of the west front, were regarded in the light of an offering, an architectural praise of God; perhaps also as symbolising the power and importance of the special conventual establishment. And the church, the material building, was also a kind of basis or buttress of the conventual plan; the cloister, with the numerous buildings for various offices of the establishment grouped round it, leaning on the church, which usually formed one boundary of its central court.

Now a modern cathedral is nothing of all this. It is not connected with a great religious establishment requiring a train of buildings grouped with it. It is not erected for an exclusive worship carried on by the clerical body on their own behalf. It is mainly a great church, principally built for the worship of the laity, with a service conducted by a limited number of priests, for and in the name of the lay congregation. It will have a chapter house, as the headquarters of the work of the diocese; beyond that, it really requires no subsidiary buildings beyond those vestries or robing-rooms which are needed in all churches. You may choose to build a cloister for the sake of effect—and indeed that secluded green *temenos* with the arcaded walk around it is so charming a feature that it might seem worth while to plan and erect it merely for its own sake; but its practical necessity or utility has gone. And even if all questions of style were put on one side, there is surely in this difference of circumstance and of object a sufficient reason why a modern cathedral should not be modelled on a mediæval one. It is built for a different class of people, for a different object, and for widely different surroundings.

The modern cathedral, then, is simply a great church—the mother church of the diocese, with a special official significance in that sense, but otherwise a church for public worship in the same sense as the parish churches. How should this consideration affect its plan, as compared with that of the mediæval cathedral? For the plan would of course be the first consideration, and here we must be careful to keep clear of the merely utilitarian fallacy. This would lead to the planning of a cathedral on some such lines as those of Queen's Hall, as some recent American churches have actually been planned. This would of course be a fatal idea, for it would be reducing the poetical symbolism of religious worship to a mere plain prose question of seating and hearing. A church, and especially a church on a great scale, is a place for indulging in spiritual aspiration, not merely for seeing or hearing. The necessity for hearing must not be forgotten, but it must not appear to be the main object. But there are two different theories on which the plan may be treated. We may regard the main space of the plan as the church for worship, in which case there must be the possibility of hearing (which to a certain extent limits its size); or we may regard the main space as a place of meditation only, and a place of monuments to the righteous who have departed, and as the vestibule to the actual place of service, which would be restricted to more manageable dimensions. This is actually the case with the mediæval plan; but the mediæval plan, with its character of length without breadth, and its restricted spaces in the choir, is most emphatically not the plan for a worship which has become essentially congregational, not merely priestly. No man asked, without knowledge

of architectural precedent, to plan a building specially suited to congregational worship, would dream of throwing it into such a form as that of the mediæval cathedral. Congregational worship implies large floor spaces, not narrow avenues.

There is nothing so grand in effect, if we want this idea of floor space, as a circular form; and as acoustics (as before agreed) are only a secondary consideration in a church, there is no practical objection to it except when it becomes so vast that a chanting voice cannot be heard across it. But this question of practicable scale depends on what function we give to the circular space. We may make it the actual worshipping space — the choir; with a vestibule in front of it and a chancel at the farther side; or we may make it occupy the position of the nave—a great domed apartment forming a solemn vestibule to the actual church which opens out of it. On a small scale St. Gereon at Cologne gives a suggestion of this, only that the nave is elliptical instead of circular. There is much to be said in favour of this idea of having the great circular space treated as a vestibule for meditation and for grandeur of effect, planning nevertheless so that it can be seen from the choir, as St. Paul's dome, with its misty lights and shadows, is seen so impressively from the choir. But we should only recommend this plan for a cathedral when it was desired to do something on so great a scale that the domed compartment would be practically too large for the conduct of a service. For any dimensions short of that, nothing can be finer and more appropriately expressive of congregational worship than the circular or Greek cross plan with a dome over it. Only whichever scheme of plan is adopted, the actual service should be contained within one compartment. Have, in other words, either a choir or a nave service, but not both combined. The uncomfortable and rambling effect of this is obvious enough at the St. Paul's services.

We have assumed the adoption of a dome as the great feature of the modern cathedral, because it is the grandest possible form in architecture—capable of far more than has yet been done with it, and is the natural and obvious manner of roofing, in a monumental form, a central area such as we have been regarding as the essential element of the modern cathedral plan. Of the detail of the modern cathedral we say nothing here, because detail is a matter which is settled by other considerations than those of plan and general structure. All that can be said in a general way is that it should be essentially symbolical in character, so far as symbolism can be combined with decorative effect. And as far as such higher forms of decoration as stained glass and mosaic pictures are concerned, they should represent the highest artistic power of the present day, not the stiffness and naïvété of an artificial archaism.

One word of warning in conclusion, to those who think they can have nothing more suitable for a modern cathedral than a revived mediæval one. This is not the place to enter on theological questions, but those who are not blind to the signs of the times cannot but see that if a modern-mediæval cathedral were built now, it will be out of date, as representing the spirit of modern religious worship, long before the present century is out.

TO THE YOUNGER GENERATION:

A FEW WORDS ON THE PRESENT SITUATION.*

By H. Heathcote Statham.

THERE can be no greater compliment than to be asked, on such an occasion as this, to say a few words to the younger generation in regard to the subject which they have chosen for their life's study and principal occupation. For the request seems to imply a belief that one has got something to say that may be of some use to them. I wish I could feel any confidence myself that there is anything I can say that would be a help or a suggestion to my younger brethren. But at all events, I have promised to try; and I have thought it better to write down my remarks, because I wish to avoid generalities and to keep to the consideration of two or three special points in regard to the conditions of modern architecture.

First, then, I would exhort you not to accept the pessimistic views of those who maintain that all architecture is a sham and a worked-out thing now, and that nothing but an entirely new beginning on a new basis can revive it. Architecture is no worse off now than it has been at any time since the Renaissance, as far at least as its higher possibilities are concerned. It is true that it is on a radically different basis since the Renaissance; but we cannot help that. At the Renaissance the world eat of the fruit of the tree of historical and literary knowledge, and nothing can undo the effect of that dose—nothing can now make it possible for us to develop architectural style in the naïve and spontaneous way in which Romanesque and Byzantine and Gothic architecture were developed, except the extinction of all civilised mankind and the obliteration of their architectural monuments, and a fresh growth of society out of barbarism. We cannot wait for that, I am afraid; nor need we desire it. The Renaissance theory of architecture is not so contemptible after all. It might even be argued that it is the higher theory; that we have exchanged the pursuit of architecture as a craft for its pursuit as an intellectual problem. We have unfortunately had nearly a century, the century just passed away, of sheer copyism—revived Greek; revived Mediæval; revived Queen Anne, whose wraith still haunts us to some extent. But we are shaking off this and coming back to the true attitude of Renaissance architecture, which was not mere revival, but an intellectual use and modification of ancient forms. St. Peter's and St. Paul's may take most of their details from antiquity, but for all that they are original architectural creations. What was done then we can do now—and better, for we have developed in these latter days much more power of invention, and much more sense of character in decorative detail, than the men of the Renaissance possessed.

The lamentations made by what may be called the socialist school of critics over the supposed death of architecture are to my mind as unreal as their remedies are unreal. They remind one of the American story of the young man who saw snakes as the effect of over-indulgence in drink, and whose father brought him home a mungoose to kill the snakes: they were imaginary snakes, and (naturally) it was an imaginary mungoose. The critics (I suppose they refuse the name of architects) of the school referred to seem to see imaginary snakes in the path of the modern architect, and their imaginary mungoose—a very imaginary one—is that architecture can only be resuscitated by our throwing over all known architectural styles and details, and by working with our own hands in building. The human mind is not made so that it can do the one, nor the human body so that it can do the other. We cannot by an act of will throw away all the influence of precedent in architecture; and it is physically impossible that the architect can erect the building with his own hands; he must have labourers under him, and tell them what to do; and there we come round in the circle again, and the architect becomes, as he now is, not the craftsman but the overseer. But the snakes, as I have said, are imaginary ones. There is, as a matter of fact, a great deal of bad architecture and bad building (the two terms are to some extent synonymous) going on at present, especially in the streets of our towns, owing to the thoughtless manner in which buildings are run up cheap and in a hurry for merely commercial objects. No good architecture, any more than good building, will ever be done cheaply and in a hurry. But apart from that, there is no real reason why we should not now be producing as good architecture as was produced in the early days of the Renaissance—or better. In other words, architecture is not a dead art unless you choose to make it so.

On the other hand, and in fact just because it is not dead, it does not require galvanising into life. That seems one of the dangers just at present, especially with the more earnest and enthusiastic of the younger generation, who have had it so preached to them that architecture is dead, and that copyism has killed it, that they are all on the *qui vive* to do something original, as they think; something picturesque; something out of the common; even something odd and eccentric, with the idea that they are putting new life into architecture. Hence all kinds of vagaries—short stumpy columns, windows in unexpected places, immense rustications enclosing half the shaft of a column, and leaving the other half bare: and so on.* These devices do impart what is called "character" to a building, no doubt, as long as they are novel; but one very soon gets tired of them. Dr. Johnson's blunt comment on some of the eccentricities in "Tristram Shandy"—"Nothing odd will do for long," is as applicable in art as in literature. Where I think the real life of modern architecture is to be found is a point we will come to just now. But I am sure it is not in this kind of thing. Eccentricities cease to attract as soon as their novelty is worn off, even with those whom they attract at all. Richardson, the American architect, who was a man of much real originality in his way of treating architecture, got hold of one of these devices for being original—the use of rows of short half-columns as a way of modelling the surface of a pier between

* An address delivered to the members of the Architectural Association School of Design, at the opening meeting of the Session on October 15.

* Perhaps even this is no new thing; human nature does not alter much; and it may be that the sculptor of the lions and column over the gateway at Mycenæ, who has puzzled architectural historians by carving the column with the thicker end at the top, was only a "new movement" artist seeking originality by using columns upside down.

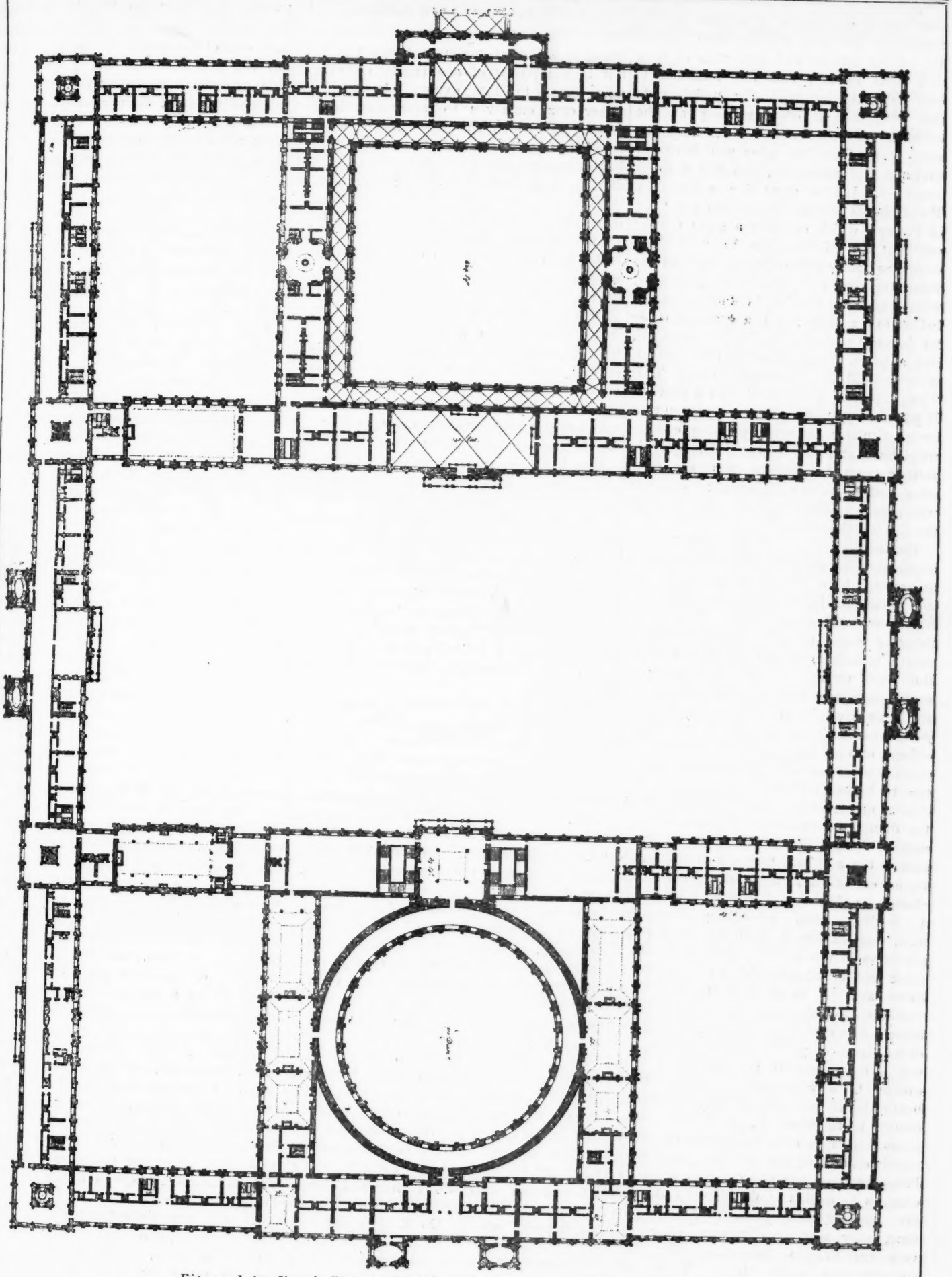

Fig. 1.—Inigo Jones's Plan for Whitehall Palace: the First Floor (from Kent).

windows, &c. It had great acceptance for a time; it became, as one may say, "H. H. Richardson—his mark," and was imitated of many. But where is it gone now? No one imitates it now; he would be rather laughed at if he did. It will be the same with the stumpy columns and exaggerated rustication of recent enthusiasts.

It is possible to be picturesque, no doubt, without being eccentric; but it is a question whether the picturesque is the true object of architectural design. The picturesque, really and truly, will only come unsought; a sought-out and carefully contrived picturesque defeats its designer's ends. At the present time there is a good deal of tendency to aim at the picturesque, especially in house building. This is only one form of what may be called the romantic fallacy in art. Goethe, who was not only one of the greatest poets but one of the greatest critics of the modern era, says:—"In all art, the romantic is the false." That seems a hard saying, and no doubt Goethe did not mean it to be taken too literally; did not mean to say that there could be no interest in romantic forms of art. What he did mean

was that the romantic in art was not the truest, not the best, not the most lasting. He wanted balance and perfection of form and ideal in art; and the romantic is essentially the irregular, the unbalanced; the exaggeration of something at the expense of the rest. That may be striking at first, but after you have got over the first impression, you feel it to be imperfect. Just the same line is taken by Horace in his celebrated poem on the "Art of Poetry," which contains a great deal of excellent art criticism, for he throughout compares poetry with painting. We do not want anything in a composition, he says, which, however striking in itself, does not belong to the whole; as if a garment, made for the most part of sober-looking materials, had a patch of purple cloth sewn into it where we did not expect such a thing. That "purple patch" has passed into a proverb. If you are a painter, again, he says, you may be particularly clever at painting cypress trees, but that is no excuse for lugging in your cypress tree when you are commissioned to paint a shipwreck: a criticism with a wide application, and as true now as the day it was written.

The bearings of these remarks lie in their application. A good deal of the work which an architect is called on to do in practice has not, unfortunately, much relation to art in its higher or intellectual sense. The whole thing is mixed up with practical requirements, sometimes of a very prosaic order. But when we can get the opportunity to contemplate and treat a building, large or small, as a whole; a building the uses of which are associated with some of the higher objects of our lives—with the repose and sanctity of life, as in the house—the aspiration to higher life, as in the church—the dignity of corporate life (or, shall we say? the dignity which it *should* have) as in a municipal building; in such cases it is the part of the architect to make of his building an embodied idea—a conception which should be whole and complete in itself; a leading idea, pervading first the plan, and expressed with the same completeness in the design. This is where I think that architecture is or can be still a living art. It is all very well for the pessimists to accuse modern architecture of being only a copied architecture, making use of the detail of preceding styles; it is not within the power of man to avoid that, except to a very limited extent. Even before the Renaissance made such a radical change in the situation, the detail in each generation or in even fifty years, depended largely on that of the preceding fifty years. However rapid and striking may seem the changes in mediæval detail, seen through the foreshortened perspective of past time, they were really very slow and very tentative to the men who were contemporary with them. They only went back, of course, to rather immediate precedent, because that was all that could occupy their attention when there was no history, little or no travel, no books, and no photographs. We have got all styles of detail thrown open to us, and we cannot escape their effect on our minds; and any man who were to resolve, on carrying out a large building, "I will have all new detail of my own invention," would either find it impossible, after all, to escape from precedent, or if he did, he would probably invent a good deal of very bad detail, doing it worse than his forefathers for the mere sake of doing it differently; simply because it is not in the power of one mind to invent new forms to that extent. It is this rather crazy endeavour to invent something entirely new which is at the bottom of what is called "l'Art Nouveau" in furniture design, in which everything is to look as if made out of ribbons and telegraph-wires; it *is* new, but as it is abominably ugly and for the most part unstructural in character, I fail to see what we have gained by it.

But it is in our power to make a new building a new conception in plan and design, with a dominant idea governing the whole. Now it is in regard to this unity of design, this prevalence of a dominant idea in the building, originating from the plan and expressed throughout the design, that there is too often failure in these days as compared with the days of the Renaissance. We see large modern mansions, for instance, which are supposed to be picturesque, in which the plan is all a ramble without a dominant motive, and the external appearance that of a house which has been added to at different times with no regard to the relation of the additions to the existing portions; and perhaps a couple of half-timbered gables thrust into a building all the rest of which is solid masonry, to make it look still more irregular and (I suppose) "picturesque." That is Horace's "purple patch" in architectural form. I do not call that architecture; I call it throwing a house together, not designing it.

Now it is in this matter of unity and completeness of idea in architecture that I think we get a valuable lesson from some of the Renaissance architects. A great deal of attention has been drawn to their work lately by several fine illustrative publications; among others by Mr. Belcher and Mr. Macartney's book on what they call the "Later Renaissance," but which I think should be called the Renaissance proper, and Mr. Triggs's collection of illustrations of the works of Inigo Jones. And what strikes one in the works of Inigo Jones and Wren especially, as compared with most modern work, is the manner in which they grasped the conception of a building as a whole, and subordinated everything else to a central idea. Every church of Wren's, for instance, is a distinct conception with a dominant idea of its own. The details they used were to a great extent borrowed (though Jones put some originality into his), and the decorative details, in Wren's buildings at all events, are often not good, and perhaps he was not really much responsible for them; but their general conception of a building was nearly always fine and always complete and consistent with itself; an architectural whole. No English architect since them seems to me to have had quite the same power of grasping a design as a whole except Sir Charles Barry, whose detail also we may not care for now, but whose conceptions were always truly architectural in their breadth and comprehensiveness. In the Houses of Parliament he used (by official order) Tudor detail; that in itself is all copyism, of course; but the conception as a whole is quite new and original, and all based upon a grand and yet perfectly simple idea in the plan.

As a further example of this unity of treatment of a building on a great scale, take the plan of Inigo Jones's intended Whitehall Palace. As a plan for a palace this is one of the grandest conceptions we know of; and observe what a simplicity and unity there is about it; the one great court in the centre; the symmetrical blocks on each side, each with its own smaller courts; the dignity gained by the centralisation of all the leading points of the plan; and the remarkable conception of the varied treatment of the two side courts, the one square, the other circular; but a variety which is kept quite subordinate to the main symmetry of the plan, and is not allowed to disturb it in the least. And what is the significance of this variety? The square court is in the nature of a cloister, for communication; the circular court is to give dignity and a special character to the State approach to the royal presence. There has hardly ever been a finer and more original idea in architecture than this of making the state access to the sovereign not an ordinary straight gallery, but a sweep round a great semi-circular colonnade. It is a real piece of poetry in architectural conception. It is true that the particular monarch in question was not worth such an approach; but that is a matter of detail which does not affect the architectural conception. The example which we have as to the architectural detail with which this palace would have been carried out, in the Banqueting House in Whitehall, though very refined as a treatment of Classic material, may be thought a somewhat cold and academical architectural clothing to have been carried out all over a vast palace such as this was meant to be. I think so myself; but even the academical detail could not destroy the greatness of such an architectural conception; nothing could kill that plan. And in the very fact that it was never carried out it serves to illustrate another point touched upon before. The pessimist critics deny that architecture is anything but building, and are always dinning into us that drawing is not architecture. It is not; but it is a means of showing and putting on record an architectural conception. An idea in architecture is an idea, whether carried into execution or not; and Inigo Jones stands before us as a greater architect than he would otherwise have appeared, in virtue of this one great conception, never built, but fortunately at least existing on paper to excite, as it ought, our admiration and emulation. I do not think there could be a better answer to the nonsense that is talked nowadays about architecture being only building, and properly the work of the craftsman. No mere craftsman could have risen to such a conception as the Whitehall Palace.

As to the use of the detail of a past style there are those, and some of them able and earnest architects, who would have us think that to stand by historical detail is a necessary condition of what they call "continuity" in architecture. It is not an indefensible position; it may at all events be better to have good detail that is old than bad detail that is new. But probably the wiser course, and the one that is most in accordance with the actual tendency of architecture in the past, is not to throw overboard the historical detail, but to regard it as a basis for gradual development and modification, little by little, as we find

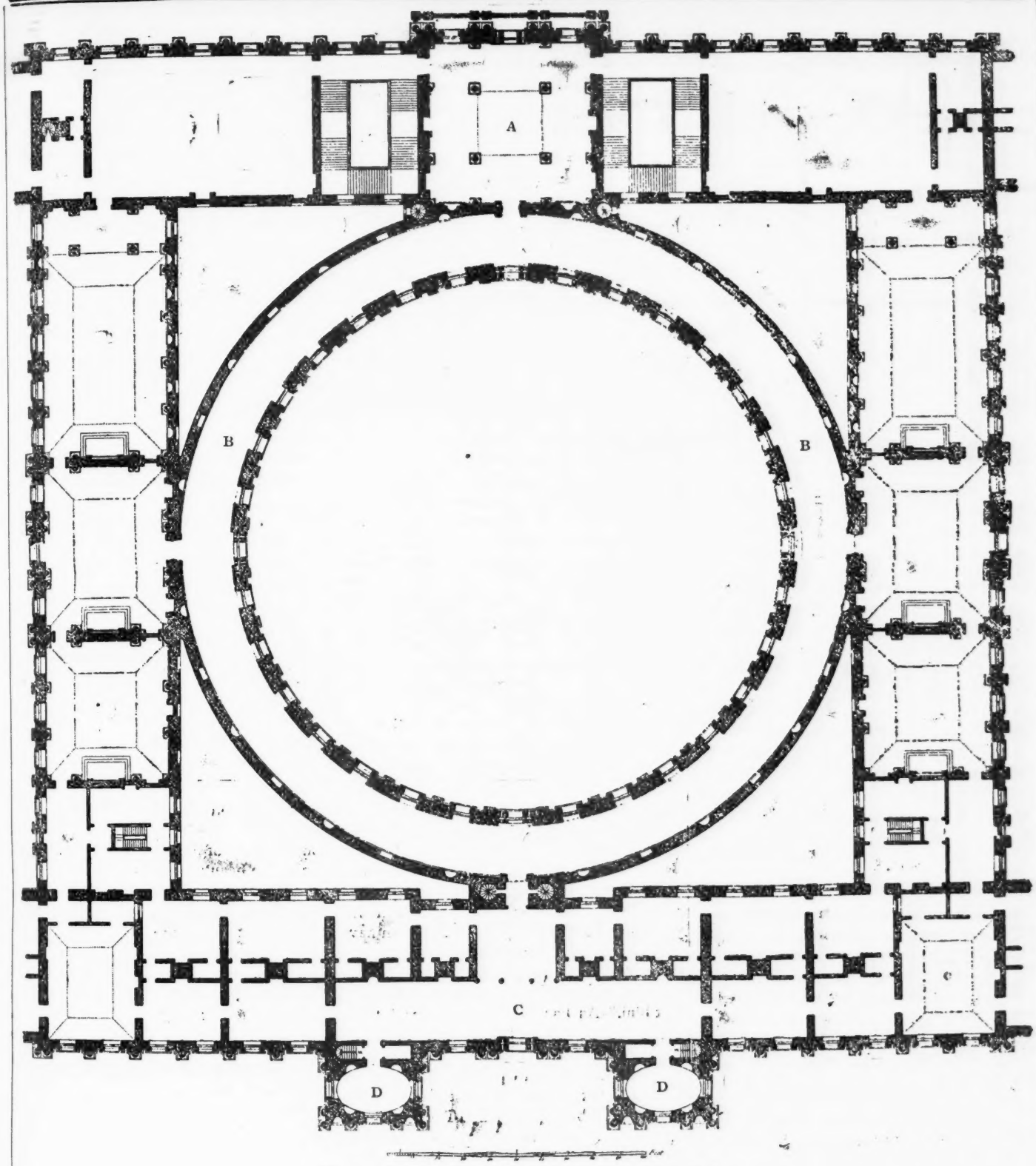

Fig. 2.—Part of the Whitehall Plan to a Larger Scale.

A. Grand Vestibule. B B. Circular Gallery forming approach to the Presence Chamber. C. Ante-room or Grand Gallery. D D. The King's Private Rooms.

opportunity; which is the way in which all the changes of style in the pre-Renaissance period really came about. They were not the result of sharp and sudden and wilful change, but of gradual modification. At the present moment there is a great leaning towards classic types in architecture, and something more may be developed out of this; but we must get rid of the idea of merely imitating the manner of Queen Anne or Jacobean detail, and try to develop it so as to give a new interest to it. We cannot do this all at once; and it is dangerous to try to break away from it violently for the sake of what is called originality. But that is not of so much consequence as is sometimes supposed. Refinement in detail, of whatever type, is indeed of the greatest importance; it is in the difference between refined and coarse detail that the hand of the artist is shown. But the particular type of detail employed is a secondary matter. The essential quality of great architecture lies in the main conception of plan and design as a whole. You might hack off all the imitation Tudor detail from the Houses of Parliament and case it all with imitation Classic detail; it would still remain a great building, and its main characteristics as such would remain unaltered.

To come from these very great and exceptional buildings to more ordinary and average erections, I would still suggest that the real object of architecture as an art is to make a building the expression of some distinct and leading idea. So-called picturesque houses and cottages are often only picturesque by association, as it were; by recalling the features and characteristics of some older buildings. In Ibsen's "Master-Builder" (the title of which ought to be "The Architect," for that is its real meaning in the original) there is an effort made to hurry Mr. Solness on behalf of a young couple who are anxious to have their house without delay. "Yes, yes," he replies, "we know all that! And so they're content to take whatever's offered them. They get a—a roof over their heads—an address—but nothing to call a home. No thank you! In that case, let them apply to some one else!" Solness's reply embodies the truth. Even an ordinary small dwelling-house may exemplify this; may have its idea. There is an interesting house at Hampstead figured in Mr. Belcher's book, which exemplifies both the existence of a distinct idea and the failure to carry it through entirely. From the plan (fig. 3) you see that the man who

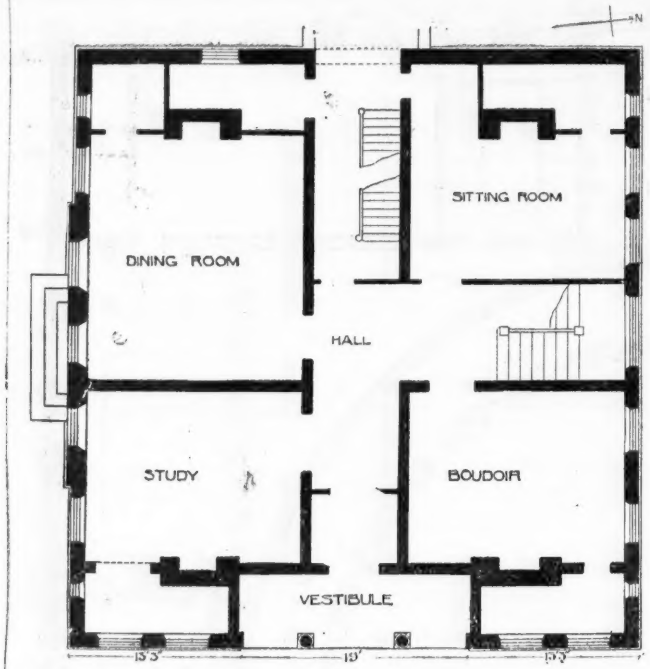

Fig. 3.

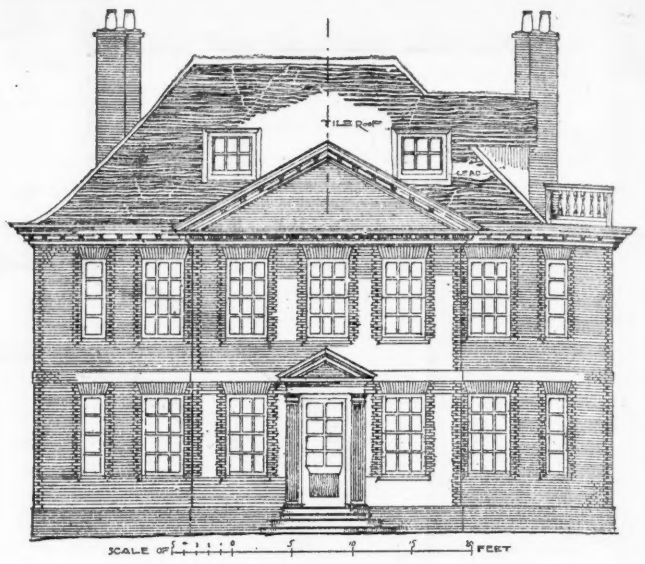

Fig. 4.

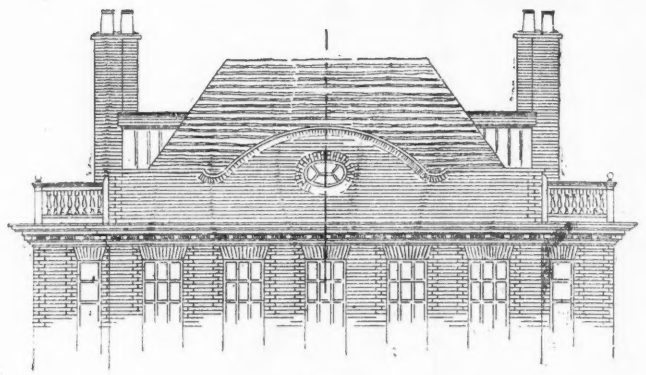

Fig. 5.

planned that house had a very good and original idea, which gives a special interest to it. He kept the chimneys inside, thereby keeping them away from the cold, and made their position the excuse or occasion for most pleasant little ante-rooms or bays out of the principal rooms. It is really a charming idea for a plan of a small house. But he failed to carry it out completely in the design. At the front of the house the treatment of the plan is recognised, at the back it is not, and the chimneys are left to come crudely through a slope of roof (fig. 4). That is an object-lesson as to the desirability of carrying out an idea thoroughly when you have one. The architect of that house just missed making a complete thing of it. The roof is put on anyhow, and out of centre with the gable; and the projection and gable on the side elevation have no relation to anything in the plan. If it had been treated in some such way as that suggested in fig. 5, the design would have been centralised and would have correctly expressed the plan.

And that reminds us of another point worth mention, viz., not to scruple to find fault with an old building because it is old. There is a weak tendency among modern architects to admire everything in an old building, instead of considering it on its merits as they would a modern building. Then the next thing to this blind admiration is blind imitation. The designers of old buildings were subject to human error like ourselves; and a study of them critically, considering what are their merits and what are their mistakes, is far more useful to our minds than accepting everything as right because it is old.

Two other reflections I would add before concluding; the first I fear an unpalatable one. It is this: not to be sure that you are right in architecture and everybody else is wrong. There is a tendency to this among architects, partly arising, perhaps, from the fact that our aims at present are rather uncertain and conflicting. It is a pity, for it is remarked on by outsiders, and gives a handle against the profession. More than once I have heard the observation—"Oh, we know that architects never admire one another's works." And I confess I have been unpleasantly struck sometimes by hearing a quite young man, who has done nothing but make sketches and prize designs, speak with the most sovereign and sweeping contempt of an eminent architect who has carried out buildings which his youthful critic probably could not even have planned, much less carried out: and this for no better reason, apparently, than that the eminent architect's notion of detail does not suit him. As has been well observed, "We are none of us infallible, not even the youngest"; and it would surely be fitting for youthful critics to consider the work of their eminent seniors at least in a merciful spirit, remembering that—as a Trinity College man said of the members of the smaller Cambridge Colleges—"They, too, are God's creatures."

The other observation I have to make is less disagreeable, and perhaps unnecessary here: it is, to make perfection in architecture for its own sake an object, and not for what you can get out of it. But I think that sentiment will meet with plenty of sympathy here. What has drawn me to the Architectural Association has been the feeling that at your meetings there is really a desire to promote the best study of architecture as an object worth trouble in itself. You do not here waste time and try each others' tempers by wretched wrangles about the wording of by-laws, and who ought to have votes and who ought not, and so on; matters which might be settled in five minutes by sensible people with no axes to grind, and which have truly little enough to do with "the advancement of architecture." And if those who make the love of the art rather than the desire of gain their first object—if they must be content to see others richer than themselves in bankers' balances, they have the compensation of keeping their youthfulness of spirit and their appreciation of the beauty of life. There is nothing, I believe, that ages a man's soul like money-getting, considered as a principal object; nothing that keeps the mind and the heart young like the love of Nature and of Art for their own sake; and I put the love of Nature first; for interesting and fascinating as Art is, there is something wrong about an artist who cares for Art more than for Nature. As Wordsworth has beautifully said:—

> "Nature never did betray
> The heart that loved her; 'tis her privilege,
> Through all the years of this our life, to lead
> From joy to joy; for she can so inform
> The mind that is within us, so impress
> With quietness and beauty, and so feed
> With lofty thoughts, that neither evil tongues,
> Rash judgments, nor the sneers of selfish men,
> Nor greetings where no kindness is, nor all
> The dreary intercourse of daily life,
> Shall e'er prevail against us, or disturb
> Our cheerful faith that all which we behold
> Is full of blessings."

I can wish those who are young and are beginning life nothing better than that they should live to realise the truth of those words.

NOTES.

Technical Education.

Sir Henry Roscoe's address at the Technical Institute last week was more hopeful than have been the recent utterances of most educational experts. He thinks that the country has made up its mind to a reconstruction of the educational system, and that at any rate a complete system of secondary and technical education on the lines of the Government Bill of last Session may be

expected. Perhaps this Administration may manage to carry this measure, but we confess that in the present state of politics we are not very sanguine. But if, as Sir Henry Roscoe points out, it appears feasible to carry out one portion of a new system, it is better to do so than to risk everything by attempting to load the legislative machine too heavily. More and more, in our opinion, it becomes clearer that for the purposes of technical education concentration is necessary. A great deal of money is at this moment being wasted all over England in the winter technical classes which have just begun. They are too much of an amateur character, too much mere winter pastimes which are not followed up. It is absolutely useless for young men to attend carpentry classes in some small country town one evening a week and then cease to do so when spring arrives, and afterwards trouble no more about the subject. One or two may be able to make a rabbit-hutch or a pigeon-house in consequence of these classes, but this is not technical education, and it is no exaggeration to say this is the kind of thing which in many places is now labelled as technical education.

Appeals under the Workmen's Compensation Act.

THE opening this week of the Law Courts again directs attention to the state of the appeals under the Workmen's Compensation Act. When the Courts began work on Thursday there were on the list fifty-five cases awaiting decision, as nearly as possible one-eighth of the entire number of appeals to be dealt with by the two Courts of Appeal. It is obvious, as we have already pointed out, that unless the decision of the appeals under the Workmen's Compensation Act is to fall into a chronically backward state, some special effort must be made by the authorities to deal with these appeals. The resignation of his office by the late Master of the Rolls now places as President of the Common Law Appeal Court another Judge, and, as new brooms always sweep clean, it may be that the outlook is more hopeful than it was before the commencement of the last legal vacation. We have no expectation that the Lord Chancellor will move a finger to improve the state of business, but it may be that if the Judges of the Court of Appeal can be made to understand the need for dealing with these appeals quickly, something may be done. The subject is one which the various trade organisations should take up in the interests of workmen generally, since many of these appeals are, when decided, important and governing precedents on the working of the Statute.

The Parkes' Museum.

WE cordially support and echo the protest made by Dr. Winter Blyth, in his speech at the Sanitary Institute dinner, in regard to the inadequate housing of the Parkes' Museum; an institution which as he says, is of national importance, and is constantly visited by strangers from other countries, Americans especially. Yet it is "very difficult to find," and when found is in a building cramped in regard to space and totally without distinction of character. As Dr. Blyth says, if there were a hygienic museum of such importance in Paris or any other continental city, it would be a beautiful building with a marble staircase and sculptures. It is much to be regretted that, in a country which has led the world in sanitary reform, our chief sanitary museum should be housed in such a way as to convey the impression that the nation, or the Government, are entirely indifferent on the subject.

Electric Lighting in Stoke Newington.

THE tendency of modern electrical engineering seems to be to make large central generating stations, and hence the question that is at present being considered by many Local Authorities is whether they should manufacture the supply themselves or get it from other sources "in bulk," and then retail it through their own distributing mains. Colonel Crompton, in his report on the electric lighting of Stoke Newington, discusses this question at length. The Hackney Borough Council have offered to supply electricity to Stoke Newington at a price per unit less than that at which any London company has been able to produce it for themselves. The prices quoted by Hackney are 2s. 6d. per unit for a small supply, with rebates down to 2·45d. per unit for a large supply. The Hackney Council and their able engineer, Mr. Hammond, are to be congratulated on being in a position to make this offer. Colonel Crompton gives figures which prove that, so long as the output in Stoke Newington is less than a million units per annum, it would certainly be more profitable to buy their electricity from Hackney than to manufacture it for themselves. He points out that getting the supply in bulk not only leads to considerable economies in management expenses, but also greatly reduces the capital expenditure required. The Hackney Borough Council only propose a seven years' agreement, so if at the end of that time it should seem advisable, there is nothing to prevent the Stoke Newington authorities from laying down works for themselves. Colonel Crompton also discusses the question of the "free wiring" of workmen's houses and houses held on very short tenancies, to which class most of the houses in the district belong. In Hackney the Council have entered into an agreement with the National Electric Wiring Company, under which, if the consumer wishes it, the Wiring Company will provide and fix the wires and fittings for the electric light, the consumer paying the Council a rental charge of 5½d. per lamp per quarter in addition to the meter bill. Colonel Crompton, however, points out that if a litigious consumer refused to pay this rental it would be extremely difficult for the Council or the Wiring Company to force him to pay, as the wires remain the property of the Company.

A Defective Railway System.

A SINGULAR accident occurred on the Great Western Railway at Leamington early on Sunday morning. It was due, in the first instance, to the failure of the telegraphic communication, which rendered it impossible to work the traffic by the block system. Now, the rules of railway companies make very elaborate provision for the regulation of traffic during a temporary breakdown of this nature; and whether the rules were adhered to or not in this case, is a point for the Government Inspector to clear up. According to the reports of the accident, trains were permitted to enter a section "at stated intervals," and a train which had thus been allowed to proceed towards Leamington, and had been brought to a standstill a short distance from the station, was run into by another train which had been subsequently passed into the same section. A great deal of damage was done, many waggons being completely wrecked. As they were "only" goods trains, and no personal injury ensued except to an unfortunate goods guard, the papers, of course, dismiss the occurrence in a few lines. Had a passenger train dashed into the wreckage, there would have been a different tale to tell, and it is a matter for congratulation that this did not happen. But the "time interval" system can hardly be regarded as a satisfactory one; there is a suggestion of uncertainty and insecurity about it which this occurrence goes to justify. Either the system or the officials were evidently at fault, and it is, to say the least, somewhat disquieting.

Beaufort-buildings and the Strand.

A BEGINNING has been made of the clearance of this site with the demolition of some premises on the east side of Beaufort-buildings. It is stated that the extensive alterations proposed to be effected by the Worcester Buildings Company conjointly with the Westminster City Council comprise the removal of Nos. 89-104, Strand, the closing of Herbert's-passage at the back, the widening of Beaufort-buildings, and the setting back of the building line so as to widen that portion of the Strand to 80 ft. Towards the cost of the last-named improvement the London County Council have agreed to contribute 50,000*l*. Amongst the premises thus marked for demolition is the large house, No. 96, Strand, at the corner east of Beaufort-buildings (a well known perfumer's shop), which was built in 1826 after J. B. Papworth's designs, and was occupied by Rudolph Ackermann. Papworth also built, in 1812, the large room at No. 101, Strand, for Ackermann, who had there revived the drawing school originally established by William Shipley, a co-founder of the Society of Arts. "Simpson's," Nos. 101-3, formerly Ries's Grand Divan, has replaced the old Fountain tavern, famed for its political club, which adjoined the premises of Charles Lilly, the perfumer and snuff-dealer, familiar to readers of Steele's papers in the *Tatler*. Lilly removed thence, after a fire, to the site of No. 96, where he kept Mr. Bickerstaff's Court of Honour. Beaufort-buildings marks the site of the town "inn" or mansion of the Bishops of Carlisle which at the Reformation was bestowed by Henry VIII. upon John Russell, first Earl of Bedford. Francis, the second earl, quitted it for a house he built on the north side of the Strand. The property then passed to Edward, second Marquis of Worcester, author of the "Century of Inventions" (1663) as tenant-in-tail. He let it for a while, at an annual rent of 500*l*., to Lord Clarendon, whose daughter was there married, in the night of September 3, 1660, to James, Duke of York. The third Marquis of Worcester, advanced Duke of Beaufort, let the ground for building purposes, reserving for himself at the south end the site of a small town house, which a fire consumed in 1695. Nos. 91-2, "Upton's Salisbury" tavern and dining-rooms, between Carting, formerly Dirty, lane and Beaufort-buildings, was rebuilt ten years ago after Mr. Edward Clark's designs.

The Prince of Wales's Theatre, Tottenham-st.

The old playhouse in Tottenham-street, Tottenham Court-road, together with three freehold houses in Pitt-street, in the rear, was offered for sale at the Mart last week, but the property was withdrawn after a bid of 9,600*l.* The house was originally built in 1780 for musical entertainments for Francis Pasquali, and was enlarged, as the King's Concert Room, by Novosielski, who there gave his concerts of ancient music under the frequent patronage of George III. and Queen Charlotte. Having been styled in turn as the Amphitheatre (1808, for Saunders's equestrian troupe), the Tottenham-street, the Regency, the Royalty, and the West London (1823), and vulgarly known during some portion of its not always successful career as the "Dust Hole," it was leased as the Queen's in 1835 by Mrs. Nesbitt and her coadjutor, Mme. Celeste. Mme. Celeste (Mrs. Elliott) had there made her *début* before a London audience four years before; a programme of January, 1831, mentions the "act-drop" as painted and presented by Clarkson Stanfield. The name of the house was afterwards changed to that of the Fitzroy, and again to the Queen's. A change of fortune came, however, in 1865, when, under the management of Miss Marie Wilton (Lady Bancroft), the Prince of Wales's Theatre at once became one of the most favourite and fashionable theatres in London.

Metalwork for Capetown.

Ordinary household metal wares are, as a rule, distinguished for dull insipidity, owing to the methods of their production and to the abrasive process, which removes from their surface all signs of life and feeling that tool-marks or interesting workmanship can give. Mr. Montague Fordham has just completed an order for metalwork for Government House, Capetown, which is remarkably free of the stamp of the machine. Nor are these productions copies of styles of a more or less remote period. They are the work of various craftsmen; two handsome beaten brass flower-bowls from Mr. Nelson Dawson's workshop; a pair of ecclesiastical-looking brass candlesticks by Mr. H. Wilson, simple, and certainly well designed; also a pair of copper candlesticks by Mr. Rathbone; coal-scuttles and scoops and incised brass flower stands by Mr. Nelson Dawson, the latter from designs by Miss Worthington, together with a number of large metal flower-bowls by the Birmingham Guild of Handicraft. We are used to seeing large quantities of old metalwork and furniture going to the Colonies, where such things are specially valued as the work of our forefathers; but it is encouraging to notice that modern handicraft is also in demand.

Additions to Baths, Leeds.—A Russian bath, recently added by the Leeds Corporation Baths Committee to the baths at Union-street, was recently opened. The accommodation includes hot room, warm lavatories, shampooing-room, cooling-room, and dressing-boxes for fifty persons. The new arrangement occupies the space formerly taken up by the first-class swimming-bath. The temperature in the hot room ranges from 105 deg. to 110 deg. Fahr., and is obtained by injecting showers of steam. Mr. W. S. Braithwaite, of Leeds, is the architect.

Church, Preston, Brighton.—The foundation-stone of the new church of St. John the Evangelist, at Preston, Brighton, was laid by the Bishop of Chichester on the 16th inst. It is intended to accommodate nearly 500 people, and the estimated cost is 5,480*l.*, excluding seating, lighting, and heating. This church was one of the last designed by the late Sir A. Blomfield.

THE SANITARY INSTITUTE.

The Conference on Water Supply which was held during two days last week under the auspices of the Sanitary Institute may be considered to have been mainly occupied with the consideration of the control of the sources of water supply. Mr. J. Parry opened with a paper on "The Protection of Watersheds," and the number of Bills which had been passed to enable authorities to purchase catchment areas in order to prevent fouling of water was to find its way into reservoirs for domestic use; and his conclusion was that if water supplies are to be efficiently protected against risks of pollution which would be injurious to health, the entire area over which rain is collected must be in the hands of the authority responsible for the waterworks. His remark that "these drainage areas need not necessarily be left barren and uncultivated" seems to show that he recognised the existence of a difficulty for which he hardly suggested a remedy. Cultivation to any remunerative extent can hardly be carried on without involving pollution; and the difficulty of keeping large areas of land out of any use except as a cup to collect water seems likely to be an increasing one. Dr. Seaton, Medical Officer to the Surrey County Council, dealt with the protection of water against waste and against local contamination. The latter is a much simpler matter to deal with than the contamination of the source of supply, since the responsibility for contamination can in almost all cases be brought home to individuals, who can be compelled to abate or discontinue it. In regard to waste he described the steps taken by the Surrey County Council to resist encroachments on local resources in order to provide water for London, and also to adjust the claims of different localities within the county. This point, however, hardly comes under the head of "waste" so much as under that of misappropriation. Mr. Clayton Beadle, who followed with a third paper, went into the subject of underground pumping and its effect in depleting wells and streams which had been locally relied on for water supply or for mechanical power. He instanced the effect of the pumping by the Kent Water Co. on the neighbourhood of Orpington and Crayford, especially the drying up of the Cray and the consequent loss of power to the paper mills. Many of our readers will remember the strong complaints made by large manufacturers in Hertfordshire who found their underground water surreptitiously pumped away from them to supply London. This subject was much dwelt upon in the course of discussion which followed. Mr. Castle, of Garfield (Yorkshire), described the serious effects on the underground water of the sinking of a mine in a previously agricultural district, which drained wells on which the neighbourhood depended, while in the mine the water which they were wanting aboveground was actually being pumped to waste. Mr. Siddalls, from Tiverton, spoke also strongly in favour of the claims of rural districts, as against cities at a distance, to the water on their own land. In his district they said, "Dartmoor for Devon," and thought that local wants should be supplied before water was taken out of a district. The latter principle is quite right; but "Dartmoor for Devon," if acted upon at all beyond the limit of merely securing the necessary water for local use in the first instance, would represent a dog-in-the-manger policy. A wild district like Dartmoor seems appointed by Nature as a gathering-ground for a great water supply, the ground existing under circumstances which almost preclude any serious contamination.

The present position of the London water supply was touched upon by two speakers. Mr. Burgess, the Chairman of the Liverpool Water Committee, referring to the fact that in many villages and towns contamination of water went on to a great extent, said that where a considerable population lived on the banks of a river it could never be regarded as a satisfactory source of water supply, and that the position of London in this respect was not only a menace to the population of London, but was made an excuse or example for laxity in other places. The same line was taken by Mr. F. Verney, L.C.C., who spoke of the difficulties which the London County Council had to contend with in endeavouring to secure the proper efficiency and purity of the water supply. The filtration of the London water was magnificent, but they ought not to have to depend on that for their health. There is, however, hardly any possible natural water supply which would not need filtration before use, so that argument must not be pushed too far. The speaker went on to suggest that the late Mr. Bateman's scheme for water from Wales was the right one and that no nearer source would be satisfactory, but Mr. Verney is probably mistaken in the belief that an adequate supply for London can be obtained entirely and solely from Wales. The question of London water supply was, however, after this speech ruled out by the Chairman (Professor Robinson) as involving matter of too controversial a nature.

Dr. H. R. Mill, in a paper on "Rainfall and Population in England and Wales in Relation to Water Supplies," maintained (what we have always maintained) that nature gives an ample supply of water for these islands for all possible needs, and that it is "not the water we use but the water we waste" that gives cause for anxiety. But Dr. Miller's notion of economising water consists, like that of almost all water engineers and water experts, in trying to make the users do with as little as possible, and in a rigid supervision of fittings. That is beginning at the wrong end, and putting the less before the greater. What escapes from bad fittings is a mere trifle compared with the enormous mass of rain-water which runs to waste every year through want of any systematic provision on a large scale for storing it. If that is undertaken properly, the question of the dribbles from fittings will be found to be a very secondary one, nor would there be any occasion to try to stint the use of water to householders. All water policies based on trying to reduce the amount of water used in households are thereby condemned at the outset. We do not use too much water but too little; what we ask from County Councils and water engineers is to get us more, not to try to restrict the use of what we have.

At the second meeting, on Thursday last week, Mr. W. Whitaker took the chair, and Professor Robinson, who had presided on the previous day, commenced the proceedings with a paper in which a kind of summary of the present position and recent progress of opinion in regard to the relation of rivers to water supply. We quote the following from the summary given in the *Times* report:—

"The author referred to the change of opinion which had taken place with regard to impounding reservoirs and the sedimentation of suspended matter brought down in flood-water. The Balfour Commission in 1892 expressed the opinion that flood-water was 'highly objectionable and undesirable,' whereas the recent report by Lord Llandaff's Commission stated that 'no restriction need be placed on taking flood-waters.' He thought the latter opinion would be acted upon with regard to the metropolis and would also furnish a solution of the problem of providing for the requirements of our towns, which even now is a pressing question in many places, and will be more acute as years go on. The Rivers Pollution Act of 1876 had not secured the general purification of our rivers, but something had been done in cases where special Parliamentary powers had been granted to authorities. He thought that in dealing with manufacturing effluents a certain amount of elasticity must be given in enforcing rules and standards of purity, and that cases must be carefully considered to avoid applying a rigid standard of purity under totally different circumstances. With regard to effluents from sewage outfalls, recent experience had enabled many of the difficulties to be solved, as the last few years had brought into shape remedies which were not previously available. He regarded the utilisation of bacteria in anaerobic or aerobic chambers as the solution of many existing troubles. The breaking up of organic matter by anaerobes enabled the resultant liquid to be utilised on land for agricultural purposes with greater advantage than in the crude state, and where sufficient or suitable land was not available the further treatment of the liquid in aerobic beds enabled any required standard of effluent to be attained. The application of sewage to land must be governed by sanitary, agricultural, and economic considerations. Each case should be considered on its merits, as it was seldom that two were alike."

It will be observed that the first portion of the remarks here summarised, in regard to utilisation and storing of the flood waters of rivers, is in direct opposition to the views for the most part laid down in the preceding day's discussion. The fact we take to be that the impounding of flood water from rivers is open to objection and constitutes a danger, which may however be reduced to very small proportions by adequate filtration; and that on the other hand, while admitting it to be a danger

and open to objection as regards the *quality* of water we want, it is not easy to see how we are to dispense with it when we come to consider the question of the *quantity* required. Mr. A. G. Leigh, in a paper on "The Control of Weirs and Dams on Streams in Relation to Water Supply," took up a subject which has an immediate connexion with that of river pollution, for if a river be polluted, *a fortiori* a dam will be, seeing that it forms a temporary block where all foreign matter in a stream, of a solid kind at least, is checked and collected. When dams are situated on streams the dry-weather flow of which consists almost entirely of manufacturers' and sewage effluents, one cannot be surprised that they become harbours of filth. They may, however, be turned to advantage in this sense, inasmuch as they afford at least an opportunity of intercepting and collecting matter which ought not to be in the river, and which it might be difficult to collect from the stream. If neglected, on the other hand, they only become an additional means for fouling the stream below them. What was required, Mr. Leigh said, was "a staff of river scavengers under the direction of the rivers authority, who would begin at the source of a stream and work downwards, removing all unnatural obstructions and abandoned weirs and dams, and flushing and cleansing out the stream."

The paper by Mr. H. W. Russell (Berkshire County Council) on the "Prevention of Pollution within the Thames Watershed," contained nothing new, and only stated over again the difficulties under which the Thames Conservancy find themselves in endeavouring to prevent pollution without acting oppressively towards small rural corporations or towards individual owners. He pointed out that it was a real grievance that small and poor communities should be heavily taxed for drainage schemes beyond their own requirements, "because they happen to be situated within the drainage area which supplies London with water." It is a grievance from the point of view of the small community, no doubt; but as long as we go on drinking Thames water, every possible check upon pollution must be rigidly enforced; one is sorry for the small community, but we are bound to consider the larger one first. The importance of this campaign against river pollution was opportunely enforced by the paper by Mr. Caink, the City Engineer of Worcester, with regard to the proved relation between typhoid and the state of the river at that city. Up to 1894 the river Severn, from which the water supply was derived, was polluted, and the annual rate of typhoid cases was 150 per 100,000 of population. In that year the filtration was improved, and the typhoid rate fell to 38. We must not pass without notice another significant and rather surprising fact brought forward by Mr. Caink, viz., that the typhoid statistics were lower in the towns supplied with filtered river water than in those supplied from artesian wells and from mountains. This fact, if authentic, certainly seems to tell against those who are inclined to be alarmists about the mere fact of taking drinking water from the Thames at all.

WATER SUPPLY FITTINGS EXHIBITION.

In connexion with the Conference, a well-arranged and interesting exhibition of fittings and materials more or less connected with this subject was opened during part of last week in St. Andrew's Hall, Newman-street.

A good many of the exhibits were of course well-known apparatus or materials. We had Polarite and Pasteur filters; the Maignen water-softening apparatus and the Desrumeaux water-softener and purifier; a large exhibit of the Sanitary Lead-lining Company's goods; illustrations of installations of the Septic Tank Syndicate; Messrs. Callender's bitumen sheeting for damp-courses and lining reservoirs ponds &c. At one stand were exhibited some of the apparatus used by the Sanitary Institute in their recent tests of extract ventilators and injectors.

Messrs. John Jones, Jennings, Doulton, Shanks, and Bolding, all exhibited samples of some of their best work, the general excellence of which is well known. Among things that are worth special mention is Messrs. Shanks's "aqua-jet" flushing cistern, which does away with all mechanical means for starting the siphon; a small pipe is carried about 18 in. down from the bottom of the cistern, opening into it just below the opening of the siphon; at the foot of this pipe is a compressible rubber ball, looking something like the globe at the foot of a thermometer tube; the action of a small lever compresses the ball and sets up a jet upwards in the tube, which impinges on the orifice of the siphon and starts it. This does away with some part of the mechanism in the flushing cistern, and looks as if it ought to be a method of certainty of action, which, as we all know, is not always the case in siphon-flushing cisterns. They also show a lavatory basin with a siphonic waste, the object of which is to exercise a force to draw the water out in the case of a tap being left running, on the ground that even a much larger water-way than the supply tap will not prevent a basin overflowing, in consequence of the water entering at pressure from the main, and therefore faster than the escaping water. We have known this to be actually the case in a lavatory basin which had an apparently adequate overflow; but it is a simpler remedy to enlarge the relative area of the overflow-pipe than to insert this siphon waste, an awkward-looking object standing up at the back of the basin, which has of course to be specially shaped for it. The flushing cistern just mentioned should be less noisy than those that are more filled with mechanical gearing; but the "Sanitary Appliances Syndicate (Grundy's patents)" have gone a step further with a flushing cistern on a new principle, which really is "noiseless," and is the only one we have seen that properly merits the name. This cistern is empty until it is charged for immediate use by pressure on the seat; the water is then admitted to it by the turn of a two-way valve on the main, and rises in the cistern till stopped by a conical metal float or buoy which fits into a rubber seating in a circular opening in the top of the cistern preventing the further escape of the air and consequently preventing the water from rising quite to the top of the cistern. The water discharges to the closet below simply by a direct down-pipe from the bottom of the cistern, with a perforated bell projected into the cistern which allows of an after-flush to keep the basin charged. As there is none of the drive which a siphon gives to the flush, it is obvious that the cistern must be at a certain height above the basin to get a sufficient head for a good flush; in most cases this could be done; at all events the cistern is practically "noiseless," a claim made in many other cases and not realised. Messrs. Doulton's exhibit showed admirably the beautiful working and fitting up of their "Claybury" self-closing non-concussive valve, for hospital and asylum water fittings, and also their non-concussive bath fittings, in which supply and waste are combined in one metal chamber placed outside the bath, on decorative brackets, so as to be always available for examination. Mr. Jennings had also a fine exhibit of somewhat similar appliances in the way of non-percussive valves and taps, showing also admirable finish. Messrs. Bolding exhibited some very good specimens of their "Laydas" siphonic-action closets, which have the advantage also of a great depth of water in the pan, and also some very good taps with a seating of their special material, "Boldite." They also exhibited a closet with a water-waste preventing valve on the service pipe, in lieu of the flushing cistern.

Among other things we may mention were Messrs. Townson & Mercer's fitted boxes of water analysis sets for the use of sanitary officials; Mr. George Kent's exhibit of water-meters; Greenway's sand-washing machine; Mr. Yardley's patent grooved and tongued pipe joint, which admits of a pipe being lifted for inspection or repair without disturbing the adjoining ones—this is ingeniously contrived, but we do not feel convinced of the joint being quite tight under pressure; Mr. Thomas Feather's bevelled ring for facilitating the junction of pipes at a slight angle, where a bend would not be necessary—this is an admirable contrivance and one wonders it has not been thought of before; the A. P Smith Manufacturing Company's *matériel* for water service, especially their tapping machine, for making connexions to water mains under pressure; and Messrs. Tucker & Sons' fire and hard-pressed bricks for engineering purposes.

Both the exhibition and the catalogue were very well arranged.

THE ANNUAL DINNER.

The annual dinner of the Sanitary Institute took place on Thursday, the 17th inst., at the Holborn Restaurant. Sir Francis Sharp Powell, Bart., M.P., presided, and among those present were Sir W. H. Broadbent, Sir William Church, the Mayor of Dover, the Mayor of West Ham, Mr. A. Winter Blyth, Dr. A. Newsholme, Dr. S. Cathcart, Dr. J. C. Thresh, Dr. H. R. Kenwood, Dr. Louis C. Parkes, Dr. A. W. Harris, Dr. G. Reid, Dr. C. Childs, Major R. H. Firth, Mr. T. Blashill, Mr. R. E. Middleton, Mr. T. W. Cutler, Mr. H. D. Searles-Wood, Mr. J. Osborne Smith, Mr. H. H. Collins, and Mr. E. White Wallis.

"The King" was proposed by the chairman, which was followed by "The Queen, the Duke and Duchess of Cornwall and York, and the other Members of the Royal Family," also submitted by Sir Francis Sharp Powell, M.P.

Mr. T. Blashill then proposed "The Municipal Corporations." He said there were many gentlemen gathered together on this occasion who were connected with municipal bodies, which, although not having the duties of State cast upon them, carried out the equally important duties of the preservation of the health and life of individuals of the community. It was not necessary to dilate upon the importance of those duties; this Institute, which was founded to help these corporations in every possible way, and was carrying out this intention thoroughly, was well aware of it. The assisting of municipal bodies was a very important part of the work of the Institute. It helped them largely by the holding annually of great congresses in different parts of the country, at which a very large number of delegates—some 1,200—from the corporations were sent to take part in the discussion of sanitary problems. The Institute also assisted them by holding examinations to test the merits and capacities of the persons who were candidates for positions under them. He desired to couple with the toast the Mayors of Dover and West Ham. Probably never before were these two municipalities coupled together. They were so widely different, the one so ancient, and the other so modern that little more than fifty years ago it was but a rural village. The corporations of this country, he concluded, were doing their duty, and they were alive to the necessity of sanitation, not altogether irrespective of cost, perhaps, but without undue regard to the amount of the rates.

The Mayor of Dover in responding mentioned that the corporation of which he was the head possessed its own waterworks, electric trams, and would soon have its own electric light. He considered that every corporation should be the proprietor of these undertakings, and it was certain that they would achieve a good deal more than at present if there was not quite so much red tapeism on the part of the Government and the Local Government Board. Whilst there should be some check upon corporations who might be inclined to extravagance, yet obstacles should not be placed in the way of schemes which were absolutely necessary for the good of boroughs.

The Mayor of West Ham also replied.

The Chairman, in proposing "The Duke of Cambridge (President) and the Sanitary Institute," said that for many years H.R.H. with characteristic kindness had occupied the chair at these annual dinners, but this being the year of mourning in Royal circle he had asked to be allowed to remain absent on this occasion. He (the Chairman) could not introduce the Sanitary Institute without in the first place expressing his deep regret in the loss they had sustained by the death of Mr. Rogers Field, whose presence on the Council was very frequent, and whose advice was always valuable, as his gifts were never ceasing. He had them in mind in his latest hour, as was shown by his liberal bequest of 5,000*l*. With regard to the Institute itself, it had become in one sense old—so many were the societies springing up around it—but although it was old in years it was constantly renewing its life. There never was a time when it was doing more excellent work. During the last year there were no less than seventy meetings, attended by 25,000 persons, and there had been more than 200 new applications for membership and association. They were proud of their past, they rejoiced in their present, and were determined that their future would surpass both. It was, indeed, a happy thought that drew together in one association those who were now gathered together under the auspices of the Sanitary Institute. There were those who were most eminent in the medical profession, those who were most skilled in engineering, and those

who were most acquainted with all the multifarious details of sanitary appliances. They all worked together in comradeship, without jealousy, and with one desire animating them all—how best to serve the great cause in which and for which they laboured. It was the great privilege of those who took part in their work, in a measure and to an extent, to at once guide public opinion and to exercise control over administration. There were some who sought to guide public opinion, who through their want of experience had become in the course of a few years wearisome pedants, and there were others who studied the practical side so much that they were constantly falling into errors from want of that scientific precision which was eminently necessary in order to carry out with good result any practical experiment. They guided public opinion and public opinion made laws, and laws which were made without public opinion had no validity. This was more especially applicable to laws affecting public health, which did and must affect every event in the daily life of the people. They were not content to possess knowledge, because knowledge locked up in their intellectual treasury was, for the present at least, vain and useless; but having gained that knowledge, they distributed it day by day by teaching the people to practise that which they so diligently and perseveringly brought to their notice. They had achieved a great deal. He had watched during many years the cause of public health both in Partiament and in the provinces, and he had seen how they had dispersed that terrible acquiescence in evil surroundings which paralysed all efforts and was fatal to progress. Wherever they went they found an increasing interest and a more marked readiness to co-operate with those sanitary reformers who desired to carry their healing message to the homes of the people. Whether one went into the crowded city or town, or into the village, there was to be found a readiness to learn and also a willingness to practise. There was one subject in their minds—that relating to the Parkes Museum, which he would refer to. He regarded this museum as not only of national, but of European, importance; its good effects were not confined to this country. There were some imitations of it in foreign lands; in Vienna there was a museum constituted on much the same principles, and he had reason to know that it had conferred great benefits upon Eastern Europe. They had the Parkes Museum as an inheritance, and were not content that it should remain in its present condition. They felt that the institution was not worthy of the name it bore or the object which it had to accomplish. He admired the courage of the active members of the Council of the Institute in moving to provide a place in London fitting to discharge the functions of that museum. The Council estimated the amount required as 25,000*l.*, and he hoped that sum would soon be placed in their hands by the generosity of an appreciative population. He desired to say, also, a few words with regard to the housing question. This problem had occupied their time during an important conference a few months ago. It had become a popular and almost a fashionable cry. He regarded this stage as most dangerous and one likely to lead to results of a disastrous character. He feared the demon of exaggeration. If they performed the achievement of travelling to any outside part of the country with eyes open upon the scenery, they would be impressed with the multitude of new houses which were springing up through every part of the most prolonged journey. He believed that the problem of the housing of the people was in many places now solved or about to be solved. In the Borough of Wigan—the town he represented—it was the opinion of the housing authorities that they had the solution of that problem entirely at their command. There had also been an enormous extension of dwellings for the people in Bradford owing to private enterprise. If they, in an hour of enthusiasm, built houses beyond the requirements—those houses necessarily involving a great expense—there would be a reaction which would be most harmful to their cause. There could be no doubt that in London, Liverpool, Manchester, and other such towns there was great reason for the movement, but he hoped that it would be made with discretion. With regard to the question of river pollution, they were making substantial progress, as in many other departments of their works, and he hoped the time was not far distant when the working classes, who were really their masters in these things, will take action so as to preserve themselves from contamination by foul streams and to relieve themselves from the evil of smoke. When the working man was convinced that his family were injured by the pollution of the stream and of the air, it would not be long before an effectual remedy was supplied.

Dr. A. Winter Blyth, in response, said the Institute had now been established for a quarter of a century, and he claimed that that was managed in the best way possible in the interests of the members and the community generally. Its council was composed of professional men most interested in hygiene—those men most adapted to further the aims of the Institute. Its members included not only medical officers of health, but well-known architects and famous engineers. They worked very hard indeed; during the last year, for instance, they had attended 125 meetings, which represented 700 individual attendances. There was nothing to gain personally in this work; it was all unselfish, self-denying labour. The examination of inspectors was a most important work because unless there were men properly qualified to carry out the details of this profession no sanitary advance was possible, but this was only a small part of the work of the Institute. Congresses were held from time to time attended by delegates from many large towns, and questions of vast importance were discussed. The conference on the housing of the working classes already referred to, was largely attended and certain very important conclusions were arrived at. They were not local in any sense or form but imperial in their influence. This assertion was not extravagant because they had already a branch in Australia, one in Canada, and negotiations were in progress for the formation of another in India. They wished to be world-wide because hygiene itself was a national and imperial matter. They had popularised it, but at the same time they had not neglected its technical aspect. With regard to their museum which was bequeathed by Dr. Parkes, the first professor of hygiene in this country, they wished to provide a better structure. It was visited by all the English speaking race, particularly by Americans; and it was very difficult to find. The building was not worthy of the British nation—if the museum was in Paris or some other Continental city, it would have a beautiful piece of architecture with a marble staircase and sculptured statues. They felt ashamed of the building and considered they should be housed in something more worthy of this great subject, which was so important to all the English speaking race. They knew very well that in warfare far more soldiers died from disease than at the hands of the enemy. In the present war more died from typhoid than from the sniping of the Boers, and that being so it was most important that a great institution which studied hygiene should be suitably housed and recognised by the nation. He was sorry to say that they had not yet received any funds from the Government, but they lived in hope. They had already made a commencement with regard to the building fund. If he had been asked to say the sum required for a proper building he would have put it at half-a-million, and some towns would spend more than that upon a building of a much less worthy and useful object than this. They were more modest, and put the cost at 75,000*l.* At the present time they had received subscriptions amounting to about 7,000*l.*, which included 158*l.* from the President of the Council and Vice-Presidents, 95*l.* from the members of the Council. No doubt they would receive considerable support from the provinces. The great towns which were doing such grand municipal work were indebted to this institute, because the principles that they had put in practice had been taught in theory for many years in the institute. Their various exhibits had been of great educational value, and chairmen and public health committees, medical officers, and sanitary inspectors could always find something new in their museum—something which would prove useful to them. A report of a committee, of which the late Mr. Rogers Field was the last member, had recently been published upon ventilation. Mr. Field had spent over 2,000*l.* and a good deal of the leisure of his life upon this committee, and the report was very valuable. Altogether, the institute was doing valuable work, and was worthy of support.

Dr. A. Newsholme proposed "The Guests," mentioning Sir Wm. Broadbent and Sir Wm. Church in particular. With regard to medical officers he said that Local Authorities should see that they obtained the best men by paying the best salary, and there should be some security of tenure. Sanitary science, he added, had attacked the water supply, the drainage question, &c., and now the house decorator must be made to keep the houses clean. This was a very important matter, as cleanliness in houses was a great factor in the prevention of disease.

Sir Wm. Church replied, and a toast to the Chairman concluded the proceedings.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The first meeting of the Discussion Section of the Architectural Association for the session was held on Friday, the 18th inst., at 56, Great Marlborough-street, W., at 7.30 p.m.

Mr. R. H. Weymouth, the Chairman of the section, presided, and was supported by the secretaries, Messrs. J. H. Pearson and H. Gregory Collins.

Several questions having been asked by members and replied to, the Chairman called upon Mr. H. Gregory Collins to read his paper entitled "Stables and Stable Fittings," which we print in full on another page, and which was illustrated by drawings of various stables actually carried out in different parts of the world. The discussion was opened by Mr. G. H. Smith (who proposed a vote of thanks to Mr. Collins) and carried on by Mr. C. H. Brodie (who seconded the vote of thanks). Mr. Brodie pointed out the value of a paper of this kind, where so many facts had been gathered which were of the utmost value to the architect who had to design buildings of this sort. The following gentlemen also took part in the discussion:—Messrs. Watson, Geoffrey Lucas, Jacob, and Taylor.

The meeting was particularly fortunate in having Mr. Pye Smith, of the St. Pancras Ironwork Company, present, who was kind enough to come down and give them some valuable information on stable fittings which had been gathered over an experience of a quarter of a century. Mr. Smith heartily supported the vote of thanks, and said although Mr. Collins was a young man, the paper they had listened so attentively to that evening was a most exhaustive one, and showed that he had given great attention to the subject.

There were further good things in store when the Special Visitor of the evening—Mr. Arnold Mitchell—proceeded to sum up the discussion in a speech in which he gave the members the benefit of his experience in many works which he had recently carried out.

Mr. Mitchell emphasised the value of designing separate stables for the various classes of horses in first-class stables. A proper system of ventilation was most essential, and he agreed with the author of the paper that the open channel method of drainage was the right thing. Glazed wall tiles should not be used, but a dull green tile manufactured by Messrs. Powell was satisfactory. He advocated the use of double-hung sashes in stables with the deep bottom bead.

The Chairman included in the vote of thanks to the author the names of Mr. Pye Smith and Mr. Arnold Mitchell, also Mr. Burdett-Coutts, M.P., and Messrs. Musgrave & Co. for kindly lending drawings, which was passed unanimously.

Mr. Gregory Collins having replied, the meeting terminated, and it was announced that the next meeting would be held on November 8 next, when Mr. W. E. Davis will read paper on "The Finishing of a Dwelling-House," and Mr. Walter Millard has kindly promised to attend as Special Visitor.

Theatre, North Shields.—The New Central Hall of Varieties, North Shields, has recently been opened. It has a frontage in Saville-street of 54 ft. On the ground floor are the exits to the theatre, a shop, and a buffet. On the first story is the theatre, which comprises a large hall with a tier over. The former is divided into pit and stalls, and the tier is divided into first and second circles. Accommodation is provided for about 1,000 people. The lighting throughout is electric, supplemented by gas, and the installation was carried out by the Northern Electric Engineering Co. Messrs. Hope & Maxwell, of North Shields, were the architects, and Mr. T. Robson, of the same town, the contractor.

A MODEL BUILDING TRADES' SCHOOL.

In a Report furnished to the British Government on the technical, agricultural, industrial, commercial, and art schools of Würtemburg by Dr. Frederick Rose, his Majesty's Consul at Stuttgar , some interesting particulars are supplied respecting the Royal Building Trades' School, which is described as the most important institution in Würtemberg for secondary technical education. Of the 23 similar schools in Germany, some of which are upon a much smaller scale, it is the most flourishing and important. This was evidently recognised by the authorities of the South Kensington Museum, who, after having inspected the school, invited its participation at the Health Exhibition held in London in 1884. At this Exhibition the school was awarded two diplomas, one for a series of scientific school work, and the other for the organisation of its curriculum. About seventy years ago there were in Würtemberg no cheap facilities for the further education of skilled building workmen except the costly method of taking lessons from private teachers, foremen, or architects. This disadvantage was also keenly experienced by those who wished to devote themselves solely to technical professions or to become subaltern technical State officials, and who were consequently compelled to limit their studies or to visit technical schools in France or Austria-Hungary. For these reasons the Stuttgart Trades' School was founded in 1832, following the example of the technical education institutions which were founded in Germany at Karlsruhe (1825), Munich (1827), and Dresden (1828), and of the polytechnic schools founded in Austria-Hungary at Prague (1806) and Vienna (1815). In 1840 the trades' school was raised to the level of a polytechnic school, but, as in course of time it became evident that—owing to the peculiar conditions then prevailing—the curricula for primary and secondary technical education could not exist together in one institution, a new building trades' school was founded in 1845 for secondary technical education and entirely separated from the Polytechnic School, which was converted later into the Technical High School, and devoted exclusively to primary technical education.

For a period of twenty years, until 1864, the school was only opened in the winter months, as the majority of the pupils were engaged in practical building works during the summer months, and was for this reason generally known as the Winter Building Trades School. During this time the school had made such rapid progress, and proved itself of such great importance, that in 1865 summer classes were opened, the whole school placed under the immediate supervision of the Ministry of Education with the designation "Royal Building Trades School," and a special building erected at a total cost of 30,000*l*. In 1900 two new wings were added to the original building at a cost of 12,000*l*. The special aim of the school is the partially theoretical and thoroughly practical training of technical engineers, architects, surveyors, &c., including (*a*) Practical master builders (technical architects) of different degrees; (*b*) Subaltern building inspection officials for State, district, and municipal positions; (*c*) Hydraulic engineers for canal and dam construction, erection of mills, regulation of rivers, &c.; (*d*) Mechanical engineers, managers of mechanical workshops and factories,, and foremen and draughtsmen; (*e*) Government surveyors and agricultural engineers (qualified surveyors who have attended further courses in irrigation and drainage).

The school is managed by a director and by a professorial committee, consisting of a limited number of the principal professors; this serves as an advisory board to the general professorial council (Konvent) which includes the whole of the teaching staff. This council decides, within certain limits, all important questions affecting the school, and is required to lay proposals before the Minister of Education regarding those matters which are not within its competence. The director of the school is appointed in permanence and not from year to year as at the technical high school. The organisation of the school is particular, and differs greatly from that of the technical high school and other technical schools, inasmuch as its curriculum provides facilities in the lower classes for the general and mathematical preliminary education necessary for the commencement of studies in the technical branches of the upper classes. The school consists of three special departments for (*a*) architects; (*b*) engineers; (*c*) surveyors and agricultural engineers. These three departments rest upon a common foundation, which consists of one general and two mathematical preparatory classes. Classes with too many pupils are split up into parallel classes with exactly the same professors, subjects, and duration of teaching, as it is not considered advisable to allow, as a rule, more than thirty pupils in one class. The summer and winter terms contain 100 days each, and the remaining days are free. The longest holiday period is from the beginning of August until the latter half of October, the Easter and Christmas holidays being very short. This arrangement has been devised in order to enable the pupils of all classes to devote themselves to practical work during the summer holidays. Many of the poorer pupils earn enough during the summer holidays or summer term to keep them during the winter term. The professorial staff consists of twenty-five principal or ordinary professors, and nineteen extraordinary professors and assistants.

The general technical instruction afforded by the school is assisted and supplemented by:—1. Excursions for purposes of inspection of practical work to works, factories, buildings, and various places; duration of the same, two hours, half a day, or two to eight days. The expenses for travelling are defrayed by the school. 2. Competition in the upper classes for prizes given for the best building designs; public exhibition of competitors' work. 3. Annual public exhibition of all work done by pupils during the year. 4. Permanent exhibition of the best work done by pupils of the school. 5. School library, valued at 5,000*l*. 6. Collections for instruction in architecture, mathematics, construction, mechanical and electrical engineering, chemistry, physics, surveying, freehand drawing, painting in water-colours and oil, models, &c., valued at 3,000*l*.

The number of pupils during last winter term was 823. During the summer term there were only 679, the diminution being caused by the large number of building pupils engaged in practical work during the summer, in addition to the holidays. The age of the pupils varies greatly. For instance, in the winter term there were 475 between the ages of 14 and 20, 259 between 20 and 25, 76 between 25 and 30, and 13 above 30. The lowest age was 14½; the highest, 34½; the average, 20. The large number of pupils between 20 and 25 is a very significant fact. As it may be safely assumed that a very large percentage of these pupils support themselves, their attendance shows what great value they attach to their further education. Of great interest also is an analysis of the occupations of the 823 pupils, as follows:—

Certificated master builders and aquatic engineers	16
Masons and stone hewers	376
Carpenters	137
No handiwork	69
Mechanics and metal workers	147
Surveyors and agricultural engineers	51
Other occupations (joiners, sculptors, modellers, &c.)	27

It has already been mentioned that a special feature of the Royal Building Trades' School is the position of the various technical departments upon a common basis, consisting of one general preparatory and two mathematical preparatory classes. After pupils have passed through these they commence the study of their special technical branches in the upper technical classes. Intending pupils for all classes, preparatory and technical, must either show that they have already passed through school courses enabling them to participate fully in the subjects taught, or they are required to pass an entrance examination in order to prove their educational qualifications. Pupils for Class III. must be at least seventeen years old, for Class IV. at least eighteen, for Class V. at least nineteen, and for Class VI. at least twenty. Experience in practical work is not required for the general and mathematical preparatory classes, but is absolutety necessary, however, for further study in the upper classes in which the special technical instruction commences. The minimum limits of necessary practical work for commencement of studies in practical courses have been fixed as follows: Building department, one year; mechanical engineering, one and a half to two years; surveying, two years. By this means all the pupils of the technical departments, commencing with Class III., are in possession of a sound general mathematical and practical education, with experience in drawing, before beginning their special studies in the technical departments. The total time necessary for the completion of studies is—without taking into account the periods of practical work—in the building and constructive engineering department (counting from preparatory classes), eight terms (four years); machine engineering, six terms; surveying (counting from Class I.), six terms. The fees are upon an extremely moderate scale, and amount to about 2*l*. per term, or 4*l*. per annum; they are partially or wholly dispensed with in the case of talented or industrious pupils who can produce officially-attested papers certifying to their indigent circumstances. There are also a number of small scholarships, of which his Majesty King William II. contributes twenty, and the Freemasons' Lodge three; they are each worth about 5*l*. per annum. The great majority of the pupils live in extremely moderate circumstances; the following estimate, which is the result of a number of careful inquiries, will give an approximate idea of the individual student's annual expenditure.

	£	s.	d.
Fees for two terms	4	10	0
Drawing materials, books, &c.	3	10	0
Combined bed and sitting room and board for two terms	27	10	0
Coals, light, and service	3	10	0
Miscellaneous	11	0	0
Total	£50	0	0

During the summer holidays—about three months—they either reside with their parents or relations or earn salaries by practical building, engineering, or surveying work, or as draughtsmen. Pupils of the upper classes add to their incomes by giving lessons in mathematics and technical subjects to backward pupils of the lower classes. At the end of each term the best pupils of each class receive prizes worth from 15s. to 1*l*. 15s., the second best receive diplomas, and the third best honourable mentions. After passing through the full courses the final examinations for the following diplomas are held:—

1. State diploma for building and architecture.
2. School diploma for building and architecture.
3. Diploma for hydraulic engineering.
4. School diploma for mechanical engineering.
5. State diploma for surveying.
6. State diploma for surveying and agricultural engineering.

In the last financial year the total expenditure was 10,721*l*. and the income from fees 2,781*l*., the deficit of 7,940*l*. being covered by the State. Dr. Rose, after giving these and other details, affirms that of all the German schools for secondary education which are known to him from personal inspection and experience, the Stuttgart Building Trades' School undoubtedly occupies the first rank with regard to (1) preliminary mathematical, practical, and drawing education of the pupils; (2) excellence of the instruction in the upper classes in mathematics, constructive drawing, and practical technical instruction; (3) quality of the professorial staff which is, beyond dispute, one of the best of its kind at similar institutes in the German Empire; and (4) importance of the private and public positions held in Würtemberg, Germany, and foreign countries by former pupils of the school.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this body was held at Spring-gardens on Tuesday, Mr. A. M. Torrance presiding.

Loans.—The following loans were granted to local bodies:—20,000*l*. to Shoreditch Borough Council for purchase of land; 8,000*l*. and 7,360*l*. to Camberwell Borough Council for paving works; 20,000*l*. and 5,000*l*. to Hackney Borough Council for electric light installation and meters; 6,380*l*. to St. Pancras Borough Council for street lighting; 7,480*l*. and 2,810*l*. to Hampstead Borough Council for electric light installation and meters; 2,909*l*. to Kensington Borough Council for paving works; 200,000*l*. to London School Board for schools, &c.

London Fogs.—The General Purposes Committee reported that they had had under consideration a letter from the secretary of the Meteorological Office stating that it was proposed to hold an inquiry into the occurrence and distribution of fogs in the London district, and their relation to other atmospheric and

local conditions, and asking for the co-operation and assistance of the Council in the conduct of the inquiry. The Meteorological Council make the suggestion consequent on applications which have been received from the electric supply department of one of the Local Authorities and from some of the electric supply companies of London for special forecasts or warnings of the approach of fogs, and on account of the general importance of the subject to the inhabitants of London.

The mode of procedure suggested by the Meteorological Office was the initiation of a special inquiry during the winter months into the conditions associated with the development and distribution of fog in London and its vicinity; and for that purpose (1) to obtain records from properly selected positions in various parts of London; (2) to collate these records with the general atmospheric conditions at the time of the observations as shown by the information regularly furnished to the office; and (3) as far as possible to ascertain the character of the information requisite for anticipating the occurrence of fogs in particular localities. The Committee recommended the Council to concur in the suggestion that it should assist in the initiation of a special inquiry, on the understanding that all responsibility for the conduct of such investigation do rest with the Meteorological Council, and that, subject to the passing of the annual maintenance vote, the Council contribute in the next financial year a sum of 250*l.* for the investigation. This was adopted.

Fire Alarm Posts.—The Fire Brigade Committee reported that the provision of fire alarm posts of 5 ft. 6 in. instead of 4 ft. 6 in. had to some extent prevented the misuse of the apparatus, and the Council resolved to lease for ten years posts of the new pattern from the Post Office.

Breaking-up of Thoroughfares.—The Highways Committee reported upon the result of the conference with the City Corporation on the question of breaking-up of London thoroughfares by companies and others, and now submitted the following recommendation:—

"That the Corporation of the City of London and the Councils of the respective Metropolitan Boroughs and of the City of Westminster be asked whether they will be prepared to support the London County Council in making a representation to his Majesty's Government as to the necessity for legislation to confer upon the Council, as the central authority for London, powers to make by-laws or regulations, and to enforce compliance therewith, as to the manner in which companies and others who have, for the purpose of executing works in connexion with their respective undertakings, statutory rights to break open the public thoroughfares, shall exercise such rights, and as to the time at which such works shall be commenced, and the period within which they shall be completed, and the surface of the roads re-instated."

This was agreed to.

Photographs of Old London.—The Historical Records and Buildings Committee reported that, through the kindness of Mr. Cohen, they recently obtained facilities for having photographs taken of certain paintings belonging to Mr. H. Bischoffsheim, of The Warren House, Stanmore. The pictures, which were recently on exhibition at the Whitechapel Art Gallery, are by well-known artists, and represent places of interest in London in the latter part of the eighteenth century. Mr. Bischoffsheim had now had the photographs enlarged and had generously presented a set to the Council. Their value is increased by the fact that only twelve copies of each picture were taken, the plates having then been sent to Mr. Bischoffsheim to be destroyed.

Totterdown Fields Building Schemes.—The Housing of the Working Classes Committee reported in reference to the vote of 74,093*l.* passed in July for the erection of 276 cottages at Totterdown Fields, Tooting. They invited tenders for the erection of three rows of cottages on Section A, and recommended the acceptance of that sent in by Messrs. C. B. Roberts & Co., amounting to 11,184*l.* This was adopted.

Sewage Disposal.—The Main Drainage Committee recommended that the estimate of 500*l.* in respect to the proposed alterations to the pumps at the North Woolwich Pumping Station be approved, and that the offer of Mr. John Cochrane to supply and fix the requisite new parts for 441*l.* be accepted. The Committee explained that the quantity of sewage to be pumped was far in excess of what was anticipated when the engines and pumps were put down.

Tramway Extensions, &c.—The Highways Committee presented a report on the several improvements and widening of streets required in the Metropolis in connexion with tramway proposals. The cost reached the total of 1,093,652*l.*

Illustrations.

MUNICIPAL BUILDINGS, GLASGOW.

THIS is a view of the late Mr. Young's celebrated building at Glasgow, taken from a new point of view, showing the elevation to John-street, looking towards George-square.

It is reproduced from a large and very fine washed monochrome drawing which was exhibited at the last Royal Academy.

HOUSE AT CHISLEHURST.

THIS house, the drawing of which was in the last Royal Academy Exhibition, is designed by Mr. Ernest Newton, in his usual essentially home-like style.

The materials are red bricks and red tiles. The builders were Messrs. Willett, of London.

SCULPTURE PANELS, PARES'S BANK, LEICESTER.

THESE two panels, which form part of the decoration of Pares's Bank, Leicester (Messrs. Everard & Pick, architects), illustrated in our issue of September 21, are 10 ft. by 5 ft. in dimension, and are executed in Portland stone.

In that entitled "Commerce," the central figure represents Commerce with her offspring, Peace and Enlightenment; to her left are figures suggesting the Hemispheres, east and west, bringing foodstuffs and raw materials; on her right are introduced British crafts and manufactures, to whom Commerce offers the horn of plenty.

The panel entitled "Agriculture" shows in the centre Agriculture crowned with wheat and accompanied by two children playing pastoral music; the other figures typify the corn harvest, sheep-raising, fruit-growing, and dairy-farming.

Mr. C. J. Allen, of University College, Liverpool, is the sculptor.

STABLES AND STABLE FITTINGS.*

THE question of the keep and management of horses is so intimately associated with the daily work of many of us that, although it is scarcely the professional side of the subject, I feel that I need offer no further apology in asking for an exchange of opinion on some points to which I have given my attention.

I shall endeavour in the few remarks I am going to make to speak only of those matters that will possess an interest for all of us who may be called upon to build stables, and here I may mention that I would take as a type the professional man's horse and stable, as it is more likely to come within our province to deal with our medical man before we have the good fortune to design stabling for a mansion or the buildings for a stud farm.

No one would, of course, buy a horse that he knew to be unsound, and I do not propose to enter into what constitutes unsoundness, but I would advise any one who thinks of purchasing a horse to get him examined by a veterinary surgeon whose opinion he can rely on, and tell him to give his especial attention to the horse's feet, for here, I believe, a source of evil is often overlooked, and no horse with faulty feet can stand much hard work on the roads.

I will now pass on to say a few words about the place where the horse is kept, and I propose to discuss the site and construction of the buildings by and by under the detailed headings of this paper, as these questions must be studied minutely by those who are fortunate enough to build stables, and I want to insist upon the necessity of thorough and efficient ventilation and proper drainage in stables where it is expected to keep horses healthy.

The horse is possessed of very capacious lungs and active respiration, and is adapted by nature to live and thrive best in the open air; and it is in overcrowded, badly-ventilated stables, where sanitary rules are ignored, that horses are shortest lived.

I shall come to the question of ventilation in due course, after we have settled the planning and paving. The methods are numerous, and the circumstances of each case must be fully considered in adapting means to the end. I must point out that ventilation cannot be efficient unless a sufficient amount of space be allotted to each horse, and unless the inlets and outlets are kept patent and the pavement properly designed. It is no uncommon experience to go into a stable, even one that is managed by one who would consider himself much insulted if you ventured to suggest anything wrong, and find every door and window shut, the ventilators closed or choked with bundles of straw, and the keyhole and every crevice through which fresh air can enter carefully stopped up, whilst the atmosphere is so impregnated with ammonia and organic impurities that it makes one gasp for breath and brings tears to the eyes. The drains, too, will probably be found in such a condition that they are worse than useless, and whilst they fail to carry off effete material, are themselves a fruitful source of noxious gases and organic impurities. Unfortunately, the floors of many stables are made of such material that it is impossible to obtain a quick and thorough removal of urine, &c., which collects in little pits and crevices, and there decomposes and leaks into the subsoil, which in time becomes thoroughly saturated with all that is most baneful. You have only to see the cobble paving taken up from an old stable to become thoroughly conscious of this, and it will be enough to make you insist on having a floor which is impermeable, and which can be easily cleaned with water and a brush.

The temperature of the stable is another very important point. A hot stable is generally a foul one, whereas there is a great deal of truth in the old saying that "A cool stable makes a healthy horse."

It is especially necessary that a horse should not be kept in a hot stable, when he has often to leave it and stand about perhaps for hours on a cold night with scarcely any shelter or protection, when he will be much more liable to suffer harm if he has left a hot stable than a cool, well-ventilated one.

There can be no question, I think, that, whenever it is possible, horses should be kept in loose boxes rather than stalls. No matter if the box be not more than 10 ft. square, the horse will be able to rest better in it, to select the easiest position, to move about and be more comfortable and contented. He will be much less likely to acquire the bad habits of cribbiting, kicking, &c.

Each horse in a stable should be allowed at least 1,200 cubic ft. of space, and there is no object in having the floor space larger than necessary, whilst the cost of bedding will be proportionately increased.

The War Office require 1,500 cubic ft. in cavalry stables, with more space for officers stables, and loose boxes.

There is no doubt that straw looks best in a stable, and horses which lie on it are more easily kept clean than those whose coats get ingrained and stained with moss-litter; and although the latter is said to keep the stables purer, I believe that a stable which has good paving and efficient drainage and ventilation can be kept quite as healthy where straw is used.

A point that is too often forgotten is that the food of a horse should be carefully stored.

The position of the corn-chamber and hay-loft depends largely on the nature of the site, but the arrangement should be convenient for the cutting, bruising, and mixing of the fodder.

It is generally found most convenient to have a space on the stable floor, and even when such accommodation is provided on the upper floor, one often finds an empty stall or box utilised for this purpose.

A truss of new hay or straw occupies about 11 cubic ft. of space and a cubic capacity of 396 ft.—*i.e.*, 8 ft. 3 in. by 8 ft. by 6 ft. in height will give a floor space of 66 ft., which will be sufficient to hold thirty-six trusses, or exactly one load of hay.

* A paper read at a meeting of the members of the Architectural Association Discussion Section on Friday, October 18, 1901.

Computing the daily consumption per horse to be 16 lbs., this would provide storage for 135 days. Old hay weighs 56 lbs. and new hay 60 lbs. per truss, and the size varies between 3 ft. by 2 ft. by 1 ft. 3 in. for the former, and 3 ft. by 2 ft. 6 in. by 1 ft. 6 in. for the latter, or 7·5 cubic ft. and 11·25 cubic ft. respectively.

From about 8 to 10 lbs. of oats or mixed corn, according to the size and work required of the horse, per diem is considered sufficient.

Oats weigh from 38 to 40 lbs. per bushel, and a bin measuring 6 ft. by 6 ft. by 3 ft. in height will hold about eighty bushels.

Arrangement and Planning.

In selecting a site for country house stables on a large scale, and stud farms, the utmost care should be taken to place such buildings in a warm, dry, and well-sheltered situation, convenient to the residence, or in the case of a stud farm, to the groom's house and the home farm; and in the latter case a suitable position would be off a roadway leading to the farm buildings, with the groom's house on one side, if possible facing south. If you can take advantage of a wood or plantation to shelter your buildings from the north and east winds so much the better.

The buildings may take various forms of plan as circumstances may govern, but for all first-class stables on a large scale the quadrangular or an oblong form appears to be the best and most suitable; and by placing the back of your buildings to the north you secure the maximum amount of sunshine to your yard and boxes.

The administrative department, such as the coachman's residence, sleeping-room for grooms, harness and fodder rooms, should be in a central position and easily accessible from the stalls and loose boxes. Where there is plenty of room for the yard, as in the country, it will be easy to dispose your rooms to the best advantage as regards aspect; but in London, where you are cramped for room, great care is required in planning, but I have found cases of well-planned stables for a large number of horses in towns.

If possible it is better to do without rooms or lofts over stables, but where they are necessary the floors should be of concrete, for if the grooms' rooms are immediately over the horses, and with wooden floors, the noise is liable to be disturbing at night; and in the case of the hay-loft being over the stable the forage is likely to be contaminated.

The size of the ordinary stable, such as I have mentioned as suitable for the professional man, may be arrived at by the cubic measurement necessary for the number of horses it is to hold.

For the stalls a minimum width of 16 ft. 6 in. is sufficient for a stable with a single row of stalls, which gives 9 ft. 6 in. for the division and 7 ft. passage-way at the heels, 6 ft. 2 in. centre to centre of divisions and a height of 12 ft. to the ceiling. This provides a cubic space of 1,221 feet per horse.

In the case of stables with a double row of stalls, a width of 29 ft. and a height of 12 ft. allows 1,073 cubic feet per horse.

If the roof be open, 27 ft. is sufficient for the width of stable, with a height of 10 ft. 6 in. to the under side of tie-beam. This gives 1,260 cubic feet per horse.

A combination of stalls and loose-boxes under the same roof is the arrangement generally adopted.

For loose-boxes, 12 ft. by 12 ft. by 12 ft. high gives 1,728 cubic feet.

For sick-boxes, 14 ft. by 12 ft. by 12 ft., 2,016 cubic ft., and a minimum area of 11 ft. by 11 ft., or 121 feet superficial, should be given to each loose-box.

The War Office are more generous, and make their ordinary boxes 14 ft. by 13 ft., and sick-boxes fitted with "slings" 16 ft. by 13 ft. deep.

Boxes for hunters should be at least 12 ft. by 12 ft., and for mares foaling 15 ft. by 15 ft., or thereabouts.

I have not included racing stables, or such large buildings as omnibus and tramway stables, as each would require more time than that allotted for my paper.

In designing town stables it is always a difficult matter to obtain as much frontage as can be got in the country, and it is generally necessary to have the depth at right angles to the frontage, whereas in the country the length may be parallel to the frontage, thereby allowing more light and better means of ventilating.

Paving and Draining.

All paving should we water-tight, durable, and non-slippery, and these conditions are most nearly filled by the use of the adamantine clinker bedded on concrete, not less than 6 in. thick. Before the concrete is laid the utmost care should be taken to ensure that the surface of the ground is solid and levelled to the proper falls.

The adamantine clinkers are 6 in. by 1¾ in. by 2½ in. deep, with chamfered edges, have a sandy surface and of a buff colour, which gives the floor a brighter appearance than when paved with vitrified bricks. The grooves in paviors are made semicircular, and those with the grooves crossing them diagonally, so that the brick may be laid transversely whilst the drainage will take a diagonal course towards the central channel.

In cavalry stables good cement concrete paving is found to answer most advantageously, but the stables should not be taken into use for three months after it has been laid, so as to give it ample time to set hard.

The floor of the stalls should have a fall of not more than 1½ in. in 10 ft., and the passage at the back should have a slope of 1 in 40 to centre of channel. The stable floor should be 2 in. above the level of yard.

A greater fall than 1½ in. in the length of the stall is not only unnecessary, but it puts a strain upon a horse and affects those which do not lie down to sleep. And I have frequently observed horses resort to all sorts of positions, sometimes right across the stall, in their endeavour to stand easily. Some owners of horses contend that the paving should be perfectly level, and for this purpose an iron gutter with a perforated top is designed with a slope in the bottom of 1 in. to 1½ in. in the length of the stall.

Both stalls and loose boxes should be free from traps or gullies, and the channels should discharge into traps in the open.

The herring-bone pattern of paving, to my mind, gives the most pleasing effect for passages, yards, and coachhouses.

Stock bricks and granite cubes are sometimes used, but the former are too soft for prolonged wear, and the latter share the disadvantage with the vitrified bricks of becoming slippery with wear.

But no description of paving can supply a floor that will do without brushing and washing, and it is impossible to have a sweet and healthy stable unless the litter is removed once a day and the channels thoroughly washed down.

Ventilation.

It is always desirable to have plenty of light—say at least 9 ft. super of glass space per horse, and if possible to design your window openings at a sufficient height, not less than 7 ft. above the floors. They should be placed opposite each other, and made to open by being hinged at the bottom and falling inwards, so that through ventilation may be obtained and the windows opened or closed as the temperature of the stable may necessitate.

Hopper ventilators may be used for this purpose. It is quite an exploded notion that dark stables are conducive to putting on flesh; on the contrary, defective sight, causing shying and ill-health, are the result.

When it is not possible to obtain windows on either side, Sherringham ventilators should be used for the inlet of fresh air, and a course of air-bricks, about 1 ft. 6 in. above the floor, at the head of the stall, and for the extraction of foul air gratings should be fixed at or near the ceiling level, discharging into air ducts, and carried to the ridge level by a vertical shaft, which should have an extract ventilator at the apex. The gratings should have an inlet area of 54 square inches per horse, and the vertical shafts at least 18 square inches per horse.

A fanlight over the stable door is desirable, and answers far better than louvres, as it can be closed on cold winter nights, as a recuperative process is always going on by the natural pressure of the atmosphere through crevices and under the doors, thus causing the circulation to the gratings in the ceiling; but this is not always sufficient, and it is necessary to provide means of admitting fresh air as above described by means of ventilators and gratings. The temperature of a stable should average between 50 deg. and 60 deg., and to a great extent the automatic action of the ventilators can be depended on, whilst a careful attention to the prevailing wind and the pressure of the atmosphere by the opening and closing of doors and windows will result in an even and healthy temperature.

For loose boxes when the roof is open lanterns with fixed louvres may be used, and thus form an agreeable feature in the elevation.

Details and Fittings.

All sharp corners liable to injure the horses should be avoided, as well as all projections in the nature of mouldings internally. The external angles of masonry and the outside edges of door jambs, where the doors are not hung flush with the external face of the wall, in which case the inner edges should be rounded to a height of 8 ft., and in the case of brickwork this can be done by the use of bull-nosed bricks. These bricks can also be used for window-sills, where the openings are so low down as to make them dangerous to passing horses, by the use of the ordinary square projecting stone cill.

If the walls are plastered or rendered in cement, a washable distemper of an agreeable tint may be used. Where a matchboard dado of elm or other hard wood is preferred a border of tiles above has a good effect, but they should not be glazed, as I am of opinion that the glare of light on the shiny surface is neither good for man nor horse. A neat-struck and fair joint for brickwork and the wall whitewashed looks clean and is healthy. The custom of colouring brickwork is objectionable.

The entrance door should be in two heights, and hung to open outwards—unless made to slide—with a fanlight over for ventilation, and the opening should not be less than 8 ft. high, 4 ft. 6 in. in width.

The external doors to loose boxes should have an iron grille fitted to the upper half of opening fastened with a flush spring catch, and hung to fall outwards. The internal doors to loose boxes should be 3 ft. 8 in. wide, and hung to open outwards or to swing both ways, but should not be made to open inwards only, as a horse generally takes up his position directly inside the door, and thus prevents its being opened.

Horses are separated in the stable either by wooden divisions technically known as traversers, by bales, or by poles, the latter being chiefly used in cavalry stables.

The general plan adopted is that of a wooden division with an ornamental heel post and a wrought iron ventilating ramp on the top.

A sill with a groove is fixed at the bottom to receive the boarding or cleating as it is termed, 1½ in. thick of well-seasoned oak, elm, teak, pitch pine, or red deal, fixed vertically into an intermediate iron rail which takes the underside of the ramp.

Plain wooden divisions without the ramp should be 4 ft. 6 in. high at the heel post, and 7 ft. at the head. The heel post may be of iron or wood carried up to the ceiling and strongly fixed and bedded in concrete at the base.

Where an iron ramp is used, the intermediate rail should be fixed at a height of 4 ft. 3 in. from the floor, and the ramp should be about 6 in. at heel post, and 2 ft. 6 in. high at the head. The height of the middle rail being only 4 ft. 3 in. high brings the horses into close proximity, and it is necessary to have a close panel of wood lined with sheet-iron for a distance of 3 ft. 6 in. from the head.

Portable divisions, with clutch-boxes for fixing, are sometimes fixed with the advantage of converting two stalls into a box.

Safety bars are useful, as they prevent horses which have got loose at night from injuring themselves by over-feeding, and others by kicking.

The pillars of loose boxes and heel posts of divisions should be about 4½ in. in diameter, with ornamental heads in brass or cast-iron, and the rings for pillar chains which are fixed on the front of the post or on either side, may be of brass or wrought-iron.

Loose-box partitions are similar to the stall divisions, and differ only in the top rail of the ramp being level instead of curved. The iron ventilating panels should be deeper in the front and door than in the partition. The pillars may be stiffened by the use of a wrought-iron bar in the form of an arch connecting the two. But the plainer the posts are made the better, and they should be firmly bedded in the concrete beneath the paving.

Wrought-iron work is preferable to cast-iron, but requires to be galvanised or frequently

painted, as all ironwork is largely affected by the salts of ammonia.

Brewers' and omnibus companies' stables are usually divided by means of bales. These are suspended at one end from poles, secured by cleats to the upper surface of the tie beams, running the whole length of the stable or from a hook in the ceiling. At the manger end each bale is attached by a wrought-iron link, and protected by sheet iron for a length of 3 ft.

They are made of elm or oak 2 in. thick and 14 in. deep. The upper bale is usually 8 ft. long, and suspended 2 ft. 1½ in. above the floor to the underside, and the lower bale 4 ft. long, with a space of 3½ in. between, and bolted together by ⅝ in. iron bolts.

The use of bales can only be tolerated on the score of economy of space, and they are frequently interspersed with divisions. They are soon worn out and become destroyed, and are dangerous, as horses get their legs over them when kicking, so that they should always be provided with safety hooks for the quick release of the horse.

For farm stables, &c., a plain manger of oak or elm, bound on the outer edge with sheet-iron, is the most economical, and may be considered the most suitable. They should be fixed at a height of 3 ft. 7 in., should be 12 in. deep, and can be fixed on brick corbels or manger posts, and should have iron bolts to secure them to the wall. These bolts should run through the manger, and so prevent the horse from throwing out his food with his nose.

These mangers, though fulfilling the requirements of strength and economy, are not suitable fittings for a first-class stable, and for this purpose there are a variety of designs manufactured in cast-iron, with rounded edges.

The generally accepted design is that with the corn-trough and hay-rack at the same level, and with the rack in this position the horse feeds comfortably, and without the hay-seeds falling into his eyes. Much attention has been given to mangers with the view of protecting the horse from injuring his head by getting it under its fittings, and for this purpose stout boarding or concrete is sometimes carried down to the floor, and a manger is manufactured with a guard of wrought-iron bars carried down to the floor level from the manger plate.

This arrangement also prevents the bedding being packed underneath the manger instead of being properly cleared out of the stall each day.

Corner fittings are usually fixed in the angles of loose boxes.

Halter-tying weight-boxes should be fixed beside the manger in the loose box and beneath the manger in the stalls.

Dressing rings of wrought-iron or brass should be fixed on either side of the stalls, and also on the walls externally.

Where the walls are not cemented or boarded, and the brickwork is left bare, it is necessary to provide kicking planks of elm or oak 1½ in. thick, about 4 ft. high and 5 ft. long, from the end of the stall. In some cases mats are hung over the backs of the stalls to deaden the sound of kicking and prevent injury to the horses' heels.

The harness-room should be fitted with a stove, and a supply of hot water being often necessary it should have a back boiler, from which also a row of hot-water pipes may be taken to warm the coachhouse.

For keeping bits, curb chains, spurs, and ornaments, especially those of steel, it is necessary to provide a cupboard with a glazed front and lined with cloth. Their fitting should be placed over the fireplace or against an inner wall. A stout deal table, a saddle-horse, saddle-airer, and girth-stretcher should also be provided.

The following brackets may be of ornamental cast iron and firmly fixed to a wooden rail :—

For Saddlery.

I. No. 1 ladies' saddle bracket.
II. No. 1 gentleman's saddle bracket.
III. No. 1 stirrup bracket.
IV. No. 1 girth bracket.
V. No. 2 bridle brackets.

For Driving Harness.

VI. Single-harness pad bracket.
VII. Double-harness pad bracket.
VIII. Collar brackets.
IX. Martingale and crupper bracket.
X. Rein and crupper bracket.
XI. Bridle brackets.
XII. Harness brackets.

The coachhouse doors should be made to open outwards if hinged, and with Collings's hinges locking bar and stops. They may be made to slide on runners or the opening may be closed with a revolving iron shutter. Either of these arrangements is more convenient than a centre post.

A fanlight over the door may be sufficient for lighting purposes, but care should be taken to properly ventilate the coachhouse.

In some cases where extra accommodation is required it may be necessary to construct a basement, when the carriage may be lowered or raised by an elevator.

The corn should be stored in a wooden chamber, and in large stables a special granary is constructed, apart from the stable, with an air space beneath the floor, and bins constructed for the reception of the corn.

Galvanised iron bins of various sizes, with sloping lids, may be provided in small stables.

The Winchester bushel, which was formerly the standard for England and originally kept at Winchester, was measured by a law of King Edgar and observed throughout the kingdom. It contained 2,150·42 cubic inches. The imperial standard bushel now used contains 2,218·19 cubic inches. The proportion of the latter is about 32 to 33 of the Winchester measure.

Sliding doors are the most convenient for the hayloft, and it will be found the best method to suspend them from a wrought iron rail and secured by a locking bar.

A small hoist will be useful for lifting the sacks of grain or trusses of hay to the upper floor.

The water required for the various purposes may be obtained from a well ; but in most cases it will be obtained from the company. A good-sized cistern should be provided.

Gas is most generally used for lighting, and care should be taken to fix the brackets or pendants high enough to be out of the way of the traffic, and with wire domes.

In conclusion I must say that I have purposely omitted any reference to the architectural treatment of the buildings, and may here remark that it is much better to design with taste and build with strength than to attempt the cheap and nasty.

Nothing causes so much displeasure and dissatisfaction as jerry-built work, which is continually requiring repairs, and is thus a constant source of annoyance and expense. So that if our stable is to prove a success it should be well planned, well built, thoroughly dry and wholesome, and properly drained, and efficiently lighted and ventilated.

ARCHITECTURAL SOCIETIES.

Glasgow Institute of Architects.—The annual general meeting of this Institute was held on the 15th inst., Mr. John James Burnet, President, in the chair. The President, in moving the adoption of the annual report, said the year had not been without its share of responsibilities, but he believed the Institute was becoming more and more aware of the exact nature of its responsibility as one of Glasgow's corporate bodies, and was becoming recognised as capable to advise in its interests. It was with pleasure that he had to record the very kindly reception which had been given to the circular which was issued in the early part of the year soliciting from the members some financial support for the building fund of the college. That an institution offering educational facilities not only in the practice of architecture, but ia all crafts—he would not say depending for their position on architecture, but largely depending for any artistic development of their practice on the profession—should not, in the constituent parts of its governing body, include architects seemed a gross error, but he believed that this was being recognised by those in authority, and that it might ere long be put right. In their relation with the tradesmen, or craftsmen as he preferred to call them, they had endeavoured to hold their position as neutrals ; and though they had not given that prompt response to their request to consider with them a form of contract, it was primarily because it was felt that little should be done to interfere with the liberty of each man, either on the one side or the other, to enter into such a form of contract as might seem to him most suitable in the particular circumstances ; and, above all, it was particularly necessary, in a large industrial and commercial centre like Glasgow, to avoid anything that might be looked upon as purely parochial, and might militate against the freedom of tendering by those who were outside their boundaries. In skill their craftsmen had nothing to fear from outside competition, and they could best help them and their clients to a clear and concisive contract by clear and concise drawings and descriptions of their designs. The Institute had again endeavoured by revising its suggestions for competitions to make them more useful to the public, and likely to result in abler men submitting designs; but it had done so only as recognising the competitions as a seemingly necessary evil, and hoping that the public would ultimately recognise that it was not the best way to get "light and leading," and that the only ultimate competition, amongst those who were to be their advisers, was the competition amongst men in their daily work to earn their confidence, and not by a submission of their work which, from its very nature, if it was to be of any real use to them, could only be judged under expert advice. The Institute was convinced that architecture, in the true sense of the word, could only be good when it was the result of close personal consultation between the architect and his client, between whom the structure would grow consciously fit for its purpose and unconsciously artistically effective. One of the most interesting events of this year's work had been the position which the Institute felt itself obliged to take in reference to the reconstruction of one of Glasgow's most important public and charitable institutions. It was with very great regret that the Institute felt obliged to bring the result of the Royal Infirmary competition before the public of Glasgow, and seemingly to stand in antagonism to that body of gentlemen who so freely and generously gave so much of their time to the public service connected with the management of such institutions ; but surely, if the Institute had any public duty whatever to perform, it was that of placing before the public any matter within its technical knowledge in which it felt they were being misled. No personal regard for such gentlemen should be permitted to influence its expression of opinion. In this instance the question was a very vital one, and one in which the public were entitled to the very best technical advice that could be obtained. What the Institute pleaded for, and asked the public to demand, was that such technical advice should be taken before they (the public) were led to support a scheme which, in its opinion, if carried out as at present proposed, could only lead to a very heavy first cost, enormous annual expenditure, and gross inefficiency for the purpose in view. The Council for the ensuing year was elected as follows :—Messrs. Alex. Petrie, John Jas. Burnet, James A. Morris, David Barclay, W. Forrest Salmon, A. N. Paterson, John Keppie, H. K. Bromhead, James Lindsay, N. Macwhannell, Campbell Douglas, T. L. Watson, J. M. Monro, Alex. M'Gibbon, A. Balfour, Jas. Miller, and John A. Campbell. Mr. John Keppie was elected a representative on the Joint House Committee.

TRIBUNAL OF APPEAL CASE:

THE LAYING-OUT OF NEW STREETS.

The Tribunal and Appeal under the London Building Act, 1894, sat at the Surveyors' Institution on Monday to hear an appeal by Mr. A. Cameron Corbett, M.P., under Sections 9 and 19 of the Act, against the order of the London County Council, dated July 16, refusing to sanction the formation and laying-out of a new street for carriage traffic out of the west side of Torridon-road, Hither Green, on the St. Germans estate. The members of the Tribunal present were Messrs. J. W. Penfold (Chairman), A. H. Hudson, and A. Gruning.

Mr. Cuningham Glen, barrister, appeared for the appellant, and Mr. Andrews, from the solicitors' department of the London County Council, for the respondents.

The case for the appellant was somewhat on the same lines as that advanced in the Forster appeal, heard a few weeks since by the Tribunal. The appellant is the owner of the St. Germans estate of nearly 300 acres, which has been developed within the past five years, and he now proposed to lay out the land at the western end of the estate for building purposes. The City Council objected because of the absence of direct communication between this and the Forster estate ; but in the appeal Mr.

Glen pointed out that one end of the proposed road communicated with Torridon-road and the other with Killearn-road, which were both open for carriage traffic. There was thus, he contended, "direct communication."

Mr. Hudson's suggestion and the hearing of the appeal should be adjourned pending the preparation of a plan dealing with the estate as a whole, but after considerable discussion it was decided to go on with the case.

Mr. Andrews said this was a case in which the Council felt called upon to ask, on behalf of the future residents of the district, that the roads and streets should be laid out on a general plan, with due regard to the requirements of the whole rapidly-developing neighbourhood rather than isolated estates. They were taking their stand upon a high principle. The respondents' case was, he argued, covered by the judgment in Woodham *v.* the London County Council, in which case the Tribunal had decided that very similar formation of roads was not direct communication within the meaning of the Act, and on a special case being stated for the High Court that view was upheld. Therefore, it was for the convenience of both persons laying out estates and persons interested in the matter that there should be consistency in dealing with these things. The explanation of the Council having approved of a somewhat similar formation with regard to Killearn-road was that it was part of a large scheme, and if it had come before the Council as an isolated application it would not have been approved any more than the principle of the application now before the Tribunal would be approved. Mr. Andrews also cited the case of the Hendon Local Board *v.* Pounce to show that if the result of requiring direct communication was that the land could not be laid out for building purposes, that was no real answer to the objection.

In the result the Tribunal allowed the appeal, on the condition that a strip of land about 230 ft. long by 40 ft. wide, running eastward from the southern end of the proposed new road, should be reserved unbuilt upon for future extensions of the road.

APPLICATIONS UNDER THE LONDON BUILDING ACT.

THE undermentioned applications under the London Building Act were dealt with by the London County Council on Tuesday. Unless otherwise stated consent was given. The names of applicants, &c., appear in parentheses :—

Working Class Dwellings.

Lambeth, North.—Three blocks of intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on a site between Gloucester-street and Burdett-street, Lambeth ; and of two blocks of intended dwelling-houses, to be inhabited by persons of the working class, proposed to be erected on the north side of Burdett-street and south side of Gloucester-street respectively, with irregular open spaces at the rear, and the boundary fences of the site at less than the prescribed distance from the centres of Gloucester-street and Burdett-street (Mr. S. Bircham).

Lines of Frontage and Projections.

Woolwich.—Houses with projecting one-story shops and bay windows, on the eastern side of Woolwich-road and the south-eastern side of Greenvale-road, Eltham (Mr. G. F. Logsdail on behalf of Mr. A. Cameron Corbett, M.P.).

Lambeth, North.—The rebuilding of Nos. 1 to 38, inclusive, New Cut, Lambeth (Messrs. Clutton on behalf of the Ecclesiastical Commissioners).

Strand.—A stone canopy and balcony over the entrance to the Town Hall, Charing Cross-road (Mr. J. Murray on behalf of the Council of the City of Westminster).

Dulwich.—The erection of wood and tile pents over the entrances to fourteen semi-detached houses on the west side of Calton-road, Dulwich (Mr. J. H. Cooper).

Dulwich.—The erection of a one-story office building on the south side of Thurlow Park-road, Dulwich, next Dulwich railway station (Messrs. Marten & Carnaby).

Hackney, South.—One-story shops on part of the forecourts of Nos. 20 to 44 (even numbers only inclusive), Rushmore-road, Clapton (Messrs. Holbrook Brothers on behalf of Mr. Filman).

Hampstead.—Three four-story bay windows to a block of residential flats on the site of Nos. 6 and 7, The Mount, Hampstead (Mr. C. W. Matthews).

Islington, South.—One story addition with an iron and glass shelter in front of Nos. 399, 401 and 403, City-road, Islington, at the corner of Torrens-street, so far as relates to the construction of a lean-to roof and skylight on part of the flat roof of such one-story additions (Mr. D. Hay on behalf of the City and South London Railway Co.).

Kensington, South.—An extension of period within which the erection of an addition to No. 12, Sumner-place, Kensington, to an advanced line in Old Brompton-road, was required to be commenced and completed.

St. George, Hanover-square.—An iron and glass conservatory at the first floor level at 41, Park-lane, Hyde Park (Messrs. Wetherill and Martin on behalf of Lady Meux).

Kensington, South.—A one-story addition to No. 67, Marloes-road, Kensington, to abut upon Scarsdale-villas (Messrs. J. Surrey & Son on behalf of Mrs. M. Surrey).—Refused.

Westminster.—An addition in front of No. 9, Trevor-terrace, Knightsbridge (Mr. T. Shilston on behalf of Mrs. Lewis).—Refused.

Width of Way.

Poplar.—Two sheds at the West India Docks, Poplar, at less than the prescribed distance from the centre of Bridge-road (Mr. T. Hardy on behalf of the Managers of the London and India Docks Company).

Space at Rear.

Dulwich.—A modification of the provisions of the section with regard to open spaces about buildings, so far as relates to the proposed erection of a house on the south side of Lytcott-grove, East Dulwich, near Melbourne-grove, with an irregular open space at the rear (Messrs. Allen & Hoar on behalf of Mr. G. Bransom).

Whitechapel.—A modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of additions to No. 131, Commercial-street, Whitechapel, by reason of which additions the premises would have an irregular open space at the rear, and would extend above the diagonal line as directed by Section 41 of the Act to be drawn (Messrs. Still, Wheat, & Luker on behalf of Messrs. Noakes & Frosts' trustees).—Consent refused.

Width of Way and Lines of Frontage.

Strand.—A factory building on the east side of Martlett's-court, Drury-lane, Strand, at the corner of Crown-court (Mr. H. O. Ellis on behalf of Mr. L. Upcott Gill).

Poplar.—A two-story addition to the technical schools, East India Dock-road, Poplar, to abut upon Kerbey-street, with the external walls at less than the prescribed distance from the centre of Kerbey-street (Messrs. J. & S. F. Clarkson on behalf of the Governors of the George Green Schools).

Brixton.†—A deviation from the plan approved by the Council on April 30 for the erection of a block of residential flats on the site of 400 and 402, Coldharbour-lane, Brixton, so far as relates to an increase in the height of the proposed building (Mr. F. A. Powell).—Consent refused.

Formation of Streets.

Lewisham.—A new street for carriage traffic to lead from Blythe-hill, Catford, to Montem-road.—That the name Ravensbourne-road (in continuation) be approved for the new street.

Lewisham.—Streets for carriage traffic on the Crofton Park estate on the eastern side of Crofton Park-road, Brockley.—Consent refused.

Woolwich.—New streets for carriage traffic to lead from Samuel-street to Prospect-row, Woolwich (Mr. J. Bull).—Consent refused.

Poplar.—A new street for carriage traffic to lead from Chapel House-street to East Ferry-road, Poplar (Lady Margaret Charteris).—Consent refused, and as the land upon which the street is proposed to be formed is below Trinity high-water mark, the attention of the local authority, district surveyor, and applicant be called to the provisions of Part XI. of the London Building Act, 1894, with regard to the erection of dwelling-houses upon low-lying land.

Wandsworth.—A new street for carriage traffic to lead out of the west side of Gwendolen-avenue, Putney (Mr. J. T. Leader and Mr. S. Taylor).—Consent refused.

Woolwich.—A new street for carriage traffic to lead out of the west side of Swingate-lane, Plumstead (South Metropolitan Brick Co.).—Consent refused.

Height of Buildings.

Strand.—Building on the east side of Martlett's-court, Drury-lane, at the corner of Crown-court, to exceed in height the width of Martlett's-court (Mr. H. O. Ellis on behalf of M. L. Upcott Gill).

Width of Way and Height of Building.

Rotherhithe.—Factory building on the east side of Tower Bridge southern approach, Rotherhithe, with the external walls at less than the prescribed distance from the centre of Horselydown-lane, and to exceed in height the width of that street (Mr. L. A. Withall on behalf of the Army Clothing and Equipment Co., Limited).—Consent refused.

Width of Way, Line of Frontage and Construction.

Kensington, South.—A wooden door-frame and doors in front of No. 2, Cranley-mews, Kensington (Mr. A. M. Torrance on behalf of Mr. J. D. Hill).

City of London.—An enclosed iron and concrete gangway across Bull's-head-passage, City, to connect Nos. 93 and 97, Wood-street (Mr. A. Conder). Consent refused.

Width of Way, Line of Frontage, and Deviation from Certified Plans.

St. George, Hanover-square.—Certain deviations from the plans certified by the District Surveyor, under Sections 13 and 43 of the Act, so far as relates to the proposed rebuilding of No. 47, Hertford-street, Mayfair, at less than the prescribed distance from the centre of the street, with an irregular open space at rear, and with a projecting porch and an oriel window (Messrs. Hoare & Wheeler).—Consent refused.

Dwelling Houses on Low-lying Land.

Woolwich.—Six dwelling-houses on low-lying land on the south side of Abbey-grove, Abbey Wood.

The recommendation marked † is contrary to the view of the Local Authority.

THE GROVE VALE DEPÔT.

UNDER this title the Borough Council of Camberwell have just opened a large establishment which is intended as a depôt in which the work of the borough could be centralised and the stores and materials required carefully guarded and distributed ; and its situation, in the middle of the borough, and in close proximity to the main road arteries, fits it to be the centre of municipal work and activity, and it will, it is hoped, be of the greatest assistance in the endeavour to conduct the work of the borough efficiently and economically. The Grove Vale Depôt is situated upon the north-east side of Grove Vale, almost opposite the East Dulwich station of the London, Brighton, and South Coast Railway.

The depôt premises are divided into three portions :—

(1) The main depôt ; (2) a plot of land lying between the approach road and the railway embankment, which is used for the storage of materials for road-making and other purposes ; and (3) two houses with stable for the outdoor superintendent of the district, and the foreman harness-maker, who is employed in the depôt.

The main depôt buildings have been erected from the designs of Mr. William Oxtoby, the Borough Engineer. The builder is Mr. H. L. Holloway, of Union Works, Church-street, Deptford, whose contract for the entire work, amounting to the sum of 28,195*l.*, was accepted by the last Vestry. The clerk of works, Mr. H. Castle, has supervised the execution of the work on behalf of the late Vestry and of the Borough Council.

The stabling consists of two blocks, 91 ft. 3 in. by 32 ft. each, and 12 ft. high. Each block contains stalls for nineteen horses and four loose boxes. The floors are laid with chamfered adamantine clinkers, the walls lined with glazed bricks. The eight loose boxes are all 15 ft. 4 in. by 9 ft. 4 in., and each is provided with a separate doorway to the yard.

The stall and manger fittings have been furnished by Messrs. Musgrave & Co., of Belfast and London. In fitting up these stables, the health, safety, and comfort of the horses were the points to which particular attention was given. The stall divisions and loose box enclosures are very strongly made, being practically unbreakable. The heads of the divisions are fitted with solid iron panels to prevent the horses annoying one another while feeding, and the remaining part of the divisions is fitted with open panels to allow of free ventilation throughout each range of stabling. The halter tyings are noiseless, and are arranged in such a manner that when the animal is feeding or lying down there is practically no weight dragging at his head, the whole weight being taken off by means of an automatic stopper.

The cart sheds, one 100 ft. by 46 ft., and one 80 ft. by 48 ft., are fitted with pitch-pine bumpers and also stand posts and valves for flushing purposes. There is room for eighty carts and vans. The floor is paved with asphalt and the walls lime-whited.

The fodder and corn store and machinery connected therewith take up a portion of one block, and is a four-story building. The whole of the walls are lime-whited. The machinery has been provided and fixed throughout by Messrs. Phillips & Son, of Reading. This includes a gas engine of 20 h.p., used for operations connected with the crushing of the corn, the cutting and sifting of chaff, and mixing of fodder ; a bagger is used for the automatic filling of sacks, and a crushing mill for oats and beans, a grain elevator, an automatic mixer and weigher, a chaff sifter, and a chaff elevator.

The workshops and machinery block has in the centre thereof an elliptical archway, 20 ft. wide, formed to provide a cartway for the horses and vehicles. Upon the west side of the archway are four shops floored with granolithic, one for smiths' work, one for farriers', and two for wheelwrights'.

On the east side of archway are the gas meter room, containing also apparatus used for the high pressure gas incandescent system ; the gas-engine room, containing a Crossley's "Otto" gas engine, used for driving the machines in the machine shop hereinafter described. In this block also are the cement store and the machinery shop.

The whole of the machinery is kept on the ground floor, the advantages of which are sufficiently obvious. The front of the block is built of blue Staffordshire bricks, 4 ft. 6 in. high, and red glazed bricks above to first floor, beyond which stock brickwork is used, with blue Staffordshire brick arches. The whole of the shops are provided with incandescent lanterns and brackets, for use when artificial light is required.

Another block contains the general office, weigh bridge office, the weigh bridge, and the harness-making room. A large quantity of the new harness and all the repairs are executed upon the premises, and ultimately all the harness required will be made by the Council's workmen. On the first floor are the committee-room and lavatory.

All the lamps that are fixed in the yard and stables are fitted upon the patent high-pressure incandescent lighting system. The apparatus, as before mentioned, is situated in the gas-meter house, and occupies only about 2 square feet. It is entirely automatic, and to start the machine it is only necessary to light the burners. The machine stops working when the lights are extinguished. The depôt is connected by telephone with the Town Hall, from which, by means of the switchboard, communication can be obtained with the trunk and metropolitan lines, and also with all the other depôts of the borough. The office and committee-room are also connected by telephone.

There are three fire hydrants in the yard, provided with sufficient hose to cover any portion of the premises. There is also a complete arrangement of electric fire-alarms in each building, which communicate underground with a central indicator in the cartway under the workshops.

It is intended that Grove Vale Depôt shall be the centre of municipal work. It will contain the central stores, and no articles of any description will be received at any other depôt or place in the borough without passing through the stores department at Grove Vale Depôt.

The depôt was formally opened on Monday, the 21st, by the Mayor, Councillor Matthew Wallace, Esq., J.P., &c. There were present several of the Mayors, Chairmen of the Works Committees, and officers of the various Metropolitan and surrounding boroughs, as well as the members of the Camberwell Borough Council.

Correspondence.

"LUX-CALOR" STOVES.

SIR,—In your last week's issue, in the notice with which you favour our new price-list of the "Lux-Calor*" stoves, you take exception to our claim that these stoves do not in any way pollute the air of the building in which they are used.

The claim is, however, a perfectly just one if the stoves are fitted as we wish them to be, *i.e.*, with a small tube attached to the exhaust at the bottom of the stove and led to the outside air. Then all the waste products—condensed water, carbon dioxide, &c.—pass away completely. If the stoves are not fitted in this way it is because the consumer will not incur the small extra expense.

RITCHIE & CO.

*** This provision for the removal of the combustion products is equivalent to the use of a flue, and we see no objection to the use of condensing stoves fitted in this manner in schoolrooms, provided that efficient ventilation is secured by other means. It is well to remember that the organic matter contained in animal respiration products is more dangerous to health than any constituent in the products of the complete combustion of gas, and one of the duties of a good open gas or coal fire is to assist in the removal of polluted air from an inhabited room by increasing the rate of flow of air up the chimney at the same time that it is emitting into the room a constant current of radiant heat. An electrical heater in an unventilated schoolroom would be subject to the same objection as a condensing stove fitted in the manner indicated by our correspondent. Both are harmless in themselves, but neither constitute ventilating agents.—ED.

BOOKS RECEIVED.

PUBLIC HEALTH AND HOUSING. By John F. J. Sykes, M.D. (P. S. King & Son.)

SANITARY FITTINGS AND PLUMBING. By G. Lister Sutcliffe, A.R.I.B.A., M.S.I. 5s. (D. Fourdrinier, *Builder* Office.)

ROADS: THEIR CONSTRUCTION AND MAINTENANCE; WITH SPECIAL REFERENCE TO ROAD MATERIALS. By Allan Greenwell, A.M.Inst.C.E., F.G.S., and J. V. Elsden, B.Sc.Lond., F.G.S. 5s. (D. Fourdrinier, *Builder* Office.)

NOTES ON PATENTS AND TRADE-MARKS. By J. E. Evans-Jackson. 1s. (Mardon, Son, & Hall.)

* The name was erroneously printed "Lux-Cuber" under "Trade Catalogues" in our last issue.

The Student's Column.

GAS AND GAS FITTINGS.

17.—GAS-ENGINES. GAS-HEATED INDUSTRIAL APPLIANCES.

GAS-ENGINES.—Gas-engines are now extensively used in all large towns for driving circular saws, lathes, drills, and all the tools to be found in carpenters', engineers', or smiths' workshops which are capable of being worked by mechanical power. For these purposes engines of low horse-power are used, while the larger engines are principally employed for driving dynamos for the generation of electricity.

The practical utility of the gas-engine may be said to date from the year 1876, when the Otto engine was introduced into this country, but for a long period after this date it was thought to be impossible to construct gas-engines of high horse power. Within the last ten years it has, however, been discovered that by improving the design of the cylinder liner, the piston, and the valves, so that they may all be efficiently water cooled, engines of almost any power may be constructed. Quite recently the American Westinghouse Company have constructed an engine of 1,500 B.H.P. (brake horse power) for use with the natural gas found in the United States, and it is believed that it will be possible to make them of fully double this power.

In this country the greatest number of engines are used with ordinary town (illuminating) gas, and are of low power. Many of the gas companies allow a considerable discount when a large quantity of gas is used in the day time for power purposes, and the small ground space occupied by gas-engines as compared with steam-engines is a factor of considerable importance in large towns. According to Mr. Bryan Donkin the number of gas-engines in use in the United Kingdom at the commencement of the year 1897 was 25,700, of which 4,600 were working in London, and the engines varied in size from half-man power to 100 h.-p. Of these 50 per cent. were estimated to be below 5 nominal horse-power, and 25 per cent. between 5 and 10 h.-p., the remaining 25 per cent. being larger sizes. A considerable increase has, however, occurred since 1897 both in the number of gas-engines employed and in their powers. The use of cheap power gas, such as Mond gas, Dowson gas, or water gas, is rapidly extending, with the result that even large steam engines of several hundred horse-power are gradually being rejected in favour of engines driven by gas. Messrs. Brunner, Mond, & Co., for example, have gas engines of 500 and 650 h.-p. respectively working in connexion with their electrolytic plant in Cheshire, and several municipal authorities are using gas-engines of over 100 h.-p. for the generation of electric light.

The cost per brake horse power of running a gas-engine varies with the price of the gas, the heating power of the gas, the description of gas-engine employed, and the size of the engine; but the following table may serve to convey an approximate idea of the working cost of one of 10-h.p., taking town coal-gas at 3s., water-gas at 4d., and Mond gas at 3d. per 1,000 cubic feet :—

	Heating value of gas. B.T.U. per c.-ft.	Gas consumed per b.h.p. per hour. C.-ft.	Cost per b.h.p. per hour. Pence.
Town gas ...	624	20	0·72
Water gas ...	304	40	0·16
Mond gas ...	155	80	0·24

Water gas can be manufactured by the Dellwik process at a cost of about 3½d. per 1,000 cubic feet delivered in the gasholder. The water gas plant does not occupy much ground space, and where not less than 500,000 cubic feet are consumed per day the gas can be manufactured and consumed on the works, in lieu of town gas, with great economy; but water gas cannot be distributed over large areas at so low a cost as 3½d. or 4d. per 1,000 cubic feet.

Mond gas has only about one-half the heating value of water-gas, but can be manufactured at a cheaper rate. Parliament has recently sanctioned the formation of a company to undertake the supply of Mond gas, or other similar fuel gas, to a number of towns in Staffordshire at a maximum price of 3d. per thousand cubic feet to consumers taking not less than 16 million cubic feet per annum, and 4d. per 1,000 cubic feet to those consuming less than this quantity. The company may refuse to supply any consumer requiring less than 4 million cubic feet per annum. Whether Mond gas is as suitable for distribution for power purposes as water-gas is a matter of dispute, but should the operations of the Mond Company prove a financial success there is little doubt that the use of steam as the motive power for stationary engines of less than 100 h.-p. will soon be almost completely abandoned in this country.

Steam versus Gas.—Although, even with the best modern gas-engines, from 70 to 75 per cent. of the heat developed by combustion of the gas is lost, the proportion of heat wasted by the employment of steam-engines is yet greater. Bryan Donkin gives the following table of heat efficiencies, *heat efficiency* being the ratio of heat turned into work to the total heat received by the engine.

Percentage Proportion of Heat Converted into Work.

Agent Employed to Work Engine.	Engine of 100-h.p.	Engine of 50-h.p.	Engine of 10-h.p.
Steam ...	12·5	8·3	4·0
Lighting gas ...	25·5	23·1	21·2
Water gas ...	23·5	18·7	13·3
Dowson gas* ...	23·5	18·7	13·3

The proportion of heat converted into work by a 100 h.p. gas-engine is therefore about double that converted by a steam-engine.

Gas for Electric Lighting.—Gas-engines of from 6-h.p. to 14-h.p. are extensively used for driving dynamos for private electric-lighting installations; while gas-engines of over 100-h.p. are used for municipal electric-lighting stations, a cheap fuel-gas being in the latter cases manufactured on the works. Gas-engines of high power driven by town gas are more costly than steam-engines, but when cheap power gas can be obtained as a fuel steam is the more expensive. Town gas as at present supplied is of too costly a quality for economical use as a fuel, and there is little doubt that in the immediate future the gas consumers in every part of the country will demand the supply of a cheaper lower grade gas which may be economically used in place of coal for fuel purposes, the heating power of the gas being carefully tested daily by official gas examiners.

In view of the fact that gas is in many cases the most suitable agent for generating electricity, it has been proposed that electricity shall in general practice be supplied from the same works as gas, and the gas companies of Walker and Wallsend and of St. Albans have already obtained powers from Parliament which enable them to supply electricity in addition to gas.

Gas Engines for Tramcars.—Gas has been successfully applied for driving tramcars at Blackpool, Dessau, and elsewhere, the cost of traction being less with gas than with horses. The gas is compressed under a pressure of about 90 lb. per square inch in cylinders which are placed beneath the platforms of the cars, and a compressing station is provided at one end of the line to enable the cylinders to be recharged at the end of each journey.

The Otto Cycle.—The mechanism of gas-engines constructed by different firms varies considerably in design, but most of the engines at present in use work upon what is known as the "Otto" cycle. Each cycle is completed in two revolutions, during which only one impulse is given to the piston. The following are the four operations comprised in each complete cycle :—

First revolution ...	1. The outstroke of the piston draws in air and gas.
	2. The instroke compresses this charge.
Second revolution	3. The ignition is effected, causing explosion and expansion.
	4. The products of combustion are driven out by the instroke of the piston.

In England the ignition of the explosive mixture of gas and air is usually effected by means of a Bunsen flame, but on the Continent an electric spark is commonly employed.

Gas for Industrial Appliances.—Gas is already employed as a fuel in a great number of industries, and when a supply of cheap gas

* Dowson gas closely resembles Mond gas in composition and heating power.

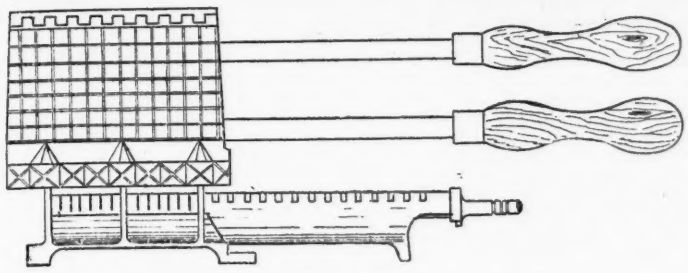

Fig. 43.—Heater for Soldering-irons.

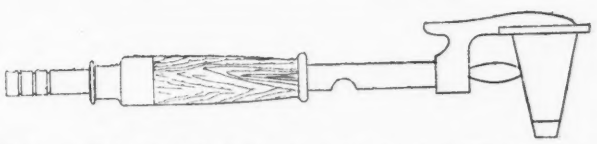

Fig. 44.—Self-heating Soldering-iron for Leaded Window Makers.

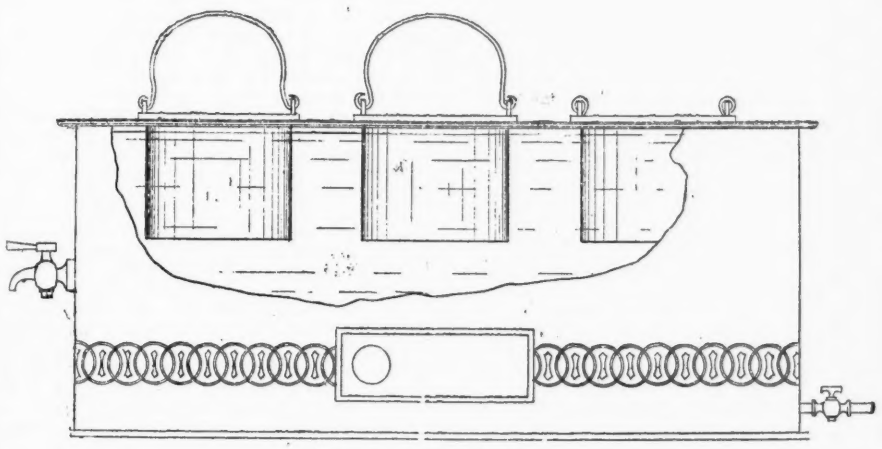

Fig. 45.—Glue-pot Stove.

is substituted for the existing costly supply, it will be yet more widely adopted. Mr. Thomas Fletcher, the pioneer in the work of adapting gas to industrial requirements, has already successfully introduced gas furnaces for enamelling, for hardening and tempering steel used for cycles, for glass-working, for gold-refining, and a host of other purposes. He has also adapted gas to many appliances of comparatively minor importance, such as blowpipes, soldering irons, and drying ovens. A vast number of ovens heated by gas for japanning work are now in operation in all parts of the country, and especially in the districts devoted to the manufacture of bicycles, the ease with which the temperature of these ovens can be adjusted to suit the description of varnish to be dried being a factor greatly in their favour. There is practically no limit to the use to which gas can be applied, but among the gas appliances already largely used in connexion with building may be mentioned gas-heated lacquering tables, blowpipes for brazing, heaters for soldering irons (fig. 43), self-heating soldering irons for leaded window makers (fig. 44), and glue-pot stoves (fig. 45), which can be made to maintain any number of glue-pots at the required temperature at very small cost.

Gas for Lead Burning.—It was at one time believed that the fusion of the edges of lead sheets in cisterns and acid chambers could only be performed by the aid of hydrogen, but it has since been found possible to perform the work equally well with coal-gas. The blow-pipe jet must be small, and a comparatively high pressure must be obtained with the aid of a small foot-blower. When coal-gas cannot be conducted by a pipe to the field of operations, cylinders containing compressed coal-gas may be employed.

OBITUARY.

MR. THOMAS LAWRENCE.—Last Monday week, October 14, the death took place, at the age of seventy-seven, of Mr. Thomas Lawrence, founder and senior partner of Messrs. Thomas Lawrence & Sons, of Bracknell. The firm were "general providers," but became known in the building world for their "T.L.B." rubber facing bricks, which are still produced in four or five large brickfields within a few miles of Bracknell. When the Berks County Council was formed Mr. Lawrence was elected member for Warfield, a position which he retained till his retirement a few years ago, when his son, Mr. Arthur Lawrence, was elected in his stead.

GENERAL BUILDING NEWS.

CORPORATION BATHS, BARTON HILL, BRISTOL.—The baths about to be erected by the Corporation of Bristol in the Barton Hill district of that city are to be of red brick, with slate roof. The entrance lobby is to be on the men's side leading to the ticket office, and immediately in the interior of the building there are to be a number of commodious dressing-boxes, adjacent to which are the slipper, needle, and spray baths. These baths are also to be flanked at the other end with another series of dressing-boxes which divides the special baths from the ordinary baths. Of these there will be eighteen for men of the second-class order and six of the first-class character, a large waiting-room being adjacent. A spacious corridor will divide these single baths from the general swimming-bath and the women's department, which ranks at the end of the large swimming-bath. This bath, which is to be 60 ft. long and 30 ft. wide, is surrounded by dressing cubicles. There are ten baths for women, and in that department there is the drying-room, the wash-house, the boiler-house, and other offices. There are also waiting-rooms for female customers. Bangor slates are to be used for the divisions of the baths, and white glazed bricks are to be supplied by the Farnley Iron Company. The Lancashire type of boiler is to be adopted, suitable for a working pressure of 100 lbs., and tested to 200 lbs. per square inch by hydrostatic pressure. The boilers are two in number, and 22 ft. long by 6 ft. diameter. The architect is Mr. W. S. Skinner, of Bristol.

READING-ROOM, BALCOMBE, SUSSEX.—The foundation-stone of this building was laid by Lord Frederick FitzRoy on the 16th inst. When completed the building will be 50 ft. long, 24 ft. wide, and 16 ft. high, and it will be divided by a movable screen. There will be two entrances and a wide corridor, and the reading-room will be connected with the caretaker's house. Adjoining the room will be a small library, cloakroom, and lavatory. Heating will be by means of hot-water apparatus, the furnace to be in the basement. The architect is Mr. Gerald C. Horsley, of Gray's Inn-square, London; the contractor for the general work Mr. F. Pierce, of Balcombe; and the hot-water apparatus will be supplied by Messrs. Rosser & Russell, of London.

RE-OPENING OF MARLSTON CHURCH, NEWBURY.—This ancient church after restoration and enlargement was reopened on the 14th inst. The building as enlarged consists of nave 45 ft. long, and a chancel 22 ft. long and 18 ft. wide. The old walls were underpinned to a depth of 4½ ft. with solid brickwork in cement and a damp-proof course inserted. A walled-up doorway of the Norman period on the north side has been opened out, the stonework repaired, and a massive oak door with characteristic ironwork now fills the opening. The old oak roof of the nave has been entirely stripped, the timbers strengthened and repaired, and covered with oak boarding. An unsightly modern stone turret at the west end has been removed, and a bold turret of framed oak with traceried openings, and roofed with oak shingles, has been added. The massive oak posts and timbers which support the turret form a bold feature within the nave. The new chancel is an extension of the church corresponding to the nave in width and height, the separation being marked by an arrangement of oak timber framing. The new chancel roof in general character is similar to the old roof of the nave, and continues in a line therewith, but of more substantial construction, and is enriched with mouldings and cornices to give an appearance of richness as compared with the simplicity of the nave roof timbers. The chancel stalls are of oak with carved poppy heads, and traceried panels. The chancel steps are of polished Devonshire marble, and the floors of glazed encaustic tiles of a special design. In the south wall of the chancel are sedilia and credence, so designed as to form an attractive architectural feature. On the east wall is a richly-carved reredos in fine grained stone with Devonshire marble panels and central cross. Above is a three-light traceried east window filled with stained glass, executed by Mr. C. E. Kempe. The subject is "the Nativity of Our Blessed Lord." The new vestry is on the north side of the church, and there is a heating-chamber beneath it. The seats of the nave are of oak, and wood block floors on cement concrete foundation have been laid where seats are placed. All other nave flooring is of small-sized geometrical tiles of one uniform colour. The church is warmed by hot water with radiators. The whole work has cost about 2,000*l.* The heating arrangements were executed by Messrs. Fox & Son, of Finsbury; the wrought-iron metal work by Messrs. Clew & Sons, of Stroud; the reredos by Mr. H. Frith, of Gloucester; and the building works have been carried out by Messrs. Groves & Sons, of Shipton-under-Wychwood, from the designs of Mr. Slingsby Stallwood, architect, of Reading.

ADDITIONS TO SCHOOL BUILDINGS, YETHOLM, N.B.—The reopening of these buildings, after considerable alterations and additions, took place on the 14th inst. Two large classrooms for juveniles have been built, each 25 ft. wide by 20 ft. and 23 ft. long respectively. The two existing classrooms have been improved in the heating, lighting, and ventilating arrangements. Cloakrooms for the girls, infants, and boys have been built, a female staffroom added, playsheds for protection in bad weather, &c. A large portion of the adjoining field has been rented so as to enlarge the playgrounds, and new boundary walls enclosing them have been built. A heating installation has been provided, as well as a new drainage system, and various other alterations have been carried out. There is accommodation for 200 pupils. The total cost of the works, furnishing, and incidental expenses will be about 2,500*l.* The contractors were:—Mason work, Messrs. John Bruce & Sons; joiner work, Mr. John Scott; plaster work, Mr. William Bryce, all of Kelso. Mr. John Scott, Innerleithen, carried out the plumber work; Mr. William Turnbull, Yetholm, the slater work; Messrs. W. Forsyth & Sons, Edinburgh, the painter work; and Messrs. Meikle & Philp, Edinburgh, the heating. The seating has been provided by the Bennett Furnishing Co., Glasgow; the classroom partitions by the North of England School Furnishing Co., Darlington. The architect is Mr. T. P. Marwick, of York-place, Edinburgh.

OPENING OF NEW ARCADES, BIRMINGHAM.—These new arcades, which, with contingent premises, are estimated to cost about 250,000*l.*, were opened on the 18th inst. They connect the thoroughfares of Corporation-street, New-street, High-street, and Union-street, and they consist of about 200 shops and offices, some of which are already occupied, and more of which are let. The main City Arcade commences in High-street, where it adjoins the Louvre, and continues to near the junction of Corporation-street and Union-street. A branch in course of construction will lead into it from New-street. The Midland Arcade runs from New-street to the City Arcade, which it joins about half-way between Corporation-street and High-street. The facades, like most of the newer ones erected in Birmingham, are of terra-cotta, and the style of architecture is Renaissance. Within the arcades the predominant colour is green, the balustrades and pilasters of the shop fronts are ornamented with green faience, shaded in imitation of malachite. A subway underneath the thoroughfares facilitates the delivery of goods to the shops. Considerable extensions of the Louvre have been carried out in connexion with the scheme, and it is intended by another company to erect a block of shops and offices in New-street, between the Midland Arcade and the City Arcade branch. The

whole of the arcades are expected to be completed in about eight months' time, and the entire scheme about a year hence. Messrs. Newton & Cheatle, of Birmingham, are the architects.—*Birmingham Gazette.*

SANATORIUM, LIVERPOOL.—On the 18th inst. the new sanatorium for consumptives, situated at one of the highest points in Delamere Forest, near Frodsham, was opened. The architects were Messrs. Willink & Thicknesse, of Liverpool.

THEATRE, NEWCASTLE-ON-TYNE.—A new theatre of varieties, designed by Messrs. Wylson & Long, architects, of King William-street, London, is about to be erected in Newcastle. The front of the building will be in Westgate-road, from which entrances are obtained to all parts of the house. The auditorium is divided into a ground floor with two tiers over. The entrance to the stalls, fauteuils, and dress circle is obtained from the spacious entrance hall, which occupies the centre of the front. On each side of this are entrances to the pit and gallery respectively. At the rear of the pit, circle, and gallery respectively will be a spacious saloon, while throughout the building ample means of ingress and egress are provided. The building will be constructed on fire-resisting principles, and a fireproof curtain will divide the auditorium from the stage. The latter has a depth from the curtain line of 50 ft. The artistes' dressing-rooms will be situated in a separate block of buildings entirely shut off from the other portions of the buildings.

THE CORDWAINERS' HALL, CANNON-STREET.—The Hall of the Cordwainers' Co., one of the most ancient of the City guilds—the Cordwainers being named from their trade in Cordovan leather, which was manufactured in Cordova in Spain—which is situated on the north side of Cannon-street, has, during the last few months had extensive decorative works executed to it. The internal decorations of the large hall on the first floor, and the lower hall and court room on the ground floor, were originally executed in the Adam style, but beyond simple friezes, the walls and ceilings were left with plain surfaces. The Court have long felt that rooms of such good proportions required more decoration to complete them, and during the recent vacation they have had the lower hall and the court room ceilings decorated with Adam plaster work, and have had a series of oval medallions fixed to the walls, thus breaking up their bareness underneath the enriched frieze which already existed. An Adam dado has been fixed in enriched material round the two rooms, and the whole of the rooms have been decorated throughout in a rich buff colour, relieved and picked out with gold. Both the new ceilings have also been gilded in their enriched portions, and care has been taken that the rooms shall be effective not only in daylight but in artificial light, under which they are largely used. The ceilings have been supplied and fixed by Messrs. Jackson & Sons, of Rathbone-place, the painting and gilding works being executed by Messrs. Colls & Sons, of Coleman-street. The whole of the works were designed and have been carried out under the personal directions of Mr. Howard Chatfeild Clarke, of Bishopsgate-street Within, the Co.'s Surveyor.

NEW ROMAN CATHOLIC CHURCH, CASTLEBAR, IRELAND.—This church has recently been dedicated by the Archbishop of Tuam. In regard to the interior decoration of the church, a principal feature is the stained glass windows by Mayer & Co., of Munich. First to be noticed is the five-light sanctuary window, nearly 30 ft. high, which is divided into three tiers of subjects, representing in the upper row the five Joyful Mysteries of the Rosary, in the centre row the Sorrowful Mysteries, and in the lower the Glorious Mysteries. This work has been presented by the Archbishop of Tuam. There are three-light side altar windows, representing the Apparition of the Sacred Heart to Blessed Margaret Mary and St. Dominic receiving the Rosary. In addition there are three nave windows of two lights each, illustrating the Wedding at Canaan, St. John Baptist de la Salle teaching, and the Raising of Jairus' Daughter. The Stations of the Cross were supplied also by Messrs. Mayer & Co. They are bold reliefs, almost full figures, in massive carved oak frames, over 6 ft. high and nearly 4 ft. wide. The gates in the Communion rail are of wrought brass, with battlements on the capping. One of the most effective ornaments in the church is the hanging lamp before the high altar. It is 8 ft. high and 3 ft. in diameter at the widest part. The top is formed of a very finely wrought Imperial crown, richly foliated, from which depend the chains, which are relieved with enamelled Gothic shields. From the corona, which is divided into six semi-circular panels and beaten in repousse, project pedestals enriched with foliated caps, upon which are mounted six angels with extended wings. From the junction of the panels project six candle-holders carrying the chains. The lower portion of the lamp, which contains the glass for oil, is of circular form, and is worked of wrought trellis, with a crown and pedestal finely worked in repousse. The side lamps are also of brass. The lamps and gates were manufactured in the workshops of Kane and Gunning, of Dublin. The heating was by Messrs. Musgrave, of Belfast; Messrs. Ward and Partners, of Belfast, supplied some leaded lights, while Messrs. James Pearse & Sons, Dublin, supplied the three altars. Mr. J. F. Ebner did the woodblock floors throughout; T. and C. Martin the seats. The general contractor was Mr. T. B. Healy, of Tralee. The contractor for organ gallery and carving was Mr. J. A. O'Connell, of Cork. Mr. William O'Connell, also of Cork, made the entrance screens and some of the seating. Mr. Andrew Cullen, of New Ross, the richly carved confessionals; Messrs. Kane and Gunning, of Dublin, supplied the elaborate solid wrought brass gates to the sanctuary and chapels, and a wrought brass corona for the chancel. Messrs. John Fagan & Sons, of Dublin, the wrought iron-work and lightning conductors. The tiling of the church and chapels is by Messrs. Craven, Dunne & Company. The tiling of the northern baptistry is by Mr. J. C. Edwards. The architect was Mr. Walter G. Doolin, of Dublin.

NEW CHURCH, GLASGOW.—The memorial stone of a church in Glasgow was recently laid by Mr. John Wilson, of Govan. The new building is situated at the corner of Dalmarnock-road and Harvie-street, the principal entrance being from the former thoroughfare. Space has been left in the rear for hall and vestry accommodation. The total sittings provided for are 605, and the church is to be electrically lighted. Mr. J. C. M'Kellar, of Glasgow, is the architect.

CHURCH SCHOOLS, WOLVERHAMPTON.—These schools, now in progress, have been designed by Mr. Fred. T. Beck, architect, of Wolverhampton. Accommodation will be provided for the instruction of 310 girls and 350 boys. The girls will be located on the ground floor, and the boys on the first floor. A separate one-story building will provide accommodation for 190 infants. The principal rooms in the boys' and girls' schools will be 93 ft. long by 22 ft. wide, and will be divisible into three sections by means of glazed folding screens. There will also be classrooms, a teachers' room, hat and coat rooms, and lavatories for each department, the whole of these being under supervision from the main room. Both stores and caretaker's quarters are also provided. The chief infant school will be of the dimensions of 43 ft. by 24 ft., also divided by a glazed screen, while separate classrooms and rooms for boys will be provided. The buildings will be constructed of brick, with red terra-cotta window sills, simple in character and finished with Hollington stone dressings. The roofs will be covered with Staffordshire tiles, and the rooms on the ground floor with wooden blocks, those on the first floor being boarded. All the departments and rooms will be heated by means of open fireplaces, assisted by hot-water apparatus. The staircases are to be of concrete. An emergency staircase is also to be constructed. The cost of the work is about 6,000*l.*, and the schools are expected to be completed by next June. The builders are Messrs. H. Willcock & Co., of Wolverhampton.

BUILDING WORKS, RADCLIFFE OBSERVATORY, OXFORD.—At the Radcliffe Observatory during the year important works have been in progress. The great dome under which the new telescope is to stand has been finished, and the internal fittings of the new tower have been considerably advanced. The steel girders of the lifting-floor of 26 ft. in diameter have been mounted, the roller and rails to guide its motion have been placed in position, and the water main to supply the hydraulic power for raising and lowering the flood has been laid down. The telescope itself, which will be one of the finest photographic instruments in the world, is now practically finished in Sir Howard Grubb's workshops in Dublin, and the work of erecting it at Oxford will very shortly commence. Nor have the older buildings been neglected. For many months past a great scaffold has encircled the old tower built by Wyatt (1772-1795), rising to a height of about 100 ft. above the ground. The upper part of this tower, which is modelled upon the Tower of the Winds at Athens, is of a very ornamental character, and at the very top is decorated with huge figures representing the eight winds. Being built of Windrush and Bibury stone, however, a great many of the more boldly carved features had perished, especially the capitals of the handsome Corinthian columns by which the great windows are flanked. All these parts are being thoroughly restored. The work is being carried out by Messrs. Wyatt & Son, of this city. The architect is Mr. T. G. Jackson.

NEW POLICE AND FIRE STATIONS, CAMBRIDGE.—These buildings, erected on the site of the old police-station and spinning-house, were recently opened. The construction as a whole covers the requirements of a police-station and fire brigade-station, the latter being south of the former. The police-station has a pair of oak doors surmounted by a fine stone carving of the Borough Arms, the work of Mr. Frampton, sculptor. The entrance-hall has a groined ceiling and mosaic floor. On the right through an oak lobby are the inquiry office; the chargeroom adjoins, and communication is afforded by means of a hatchway. Both rooms are embellished with an oak dado to a height of about 4 ft. A portion of the chargeroom is set apart for clerical purposes, and a window on one side commands the cell corridor running off to the rear of the building. Down the corridor are the cells, ten in number, six for males, three for females, and a reception-cell, fitted with a bath for medical treatment, the last-named being nearest the chargeroom. On the right are the lavatories. In the basement, under the cells, is a heating-room which warms them, and where constables may dry their clothes or prepare refreshments. Here there is also accommodation for Morris tube practice, target and appliances having been provided by the Chief Constable. In continuation of the cell block are the quarters of the female warder and rooms for single constables. The former comprises kitchen, living-room, three bedrooms, and offices. Access is obtained by means of a door opening into the cell corridor. At the extreme end of the corridor is a mortuary in the door of which it is proposed to insert a small circular window, through which jurors may view the body without going inside the room. Here is also a room for holding inquests. Near the main entrance is a large staircase leading to the upper apartments, which is one of the principal features of the building. Like the lobby it is constructed of Bath stone, with stone balustrading, surmounted by a richly-carved newel, the foundation of a hammered brass standard electric light. The staircase is lighted by a fine circular bay window, whilst at the top of the landing is a second bay window of stained glass, facing the street, containing the arms of England, of the Borough, of the university, and of the various Cambridge Colleges. This work was executed by Messrs. Weyer, of Norwich. Opening on the landing, and approached by a handsome oak lobby, is a spacious Watch Committee-room, which is panelled with oak up to about 8 ft. or 9 ft. It possesses a massive chimneypiece, elaborately carved, and over which is a convex mirror. Above the panelling the walls are stone-faced, and there is a moulded plaster Renaissance ceiling. The floor is of oak, and the room is lighted by means of four pairs of windows. In connexion with the room there is a private office and lavatory accommodation. The entrance hall communicates by a door at the back with a large covered-in court-yard, being flanked at one side by the cell portion of the building, on the other by the police quarters, and at the rear by the Chief Constable's house. The courtyard is adapted for a drill yard, and is covered with a glass roof. On the left of this is a block containing on the ground floor the parade-room, and over it at one end the lecture-room and recreation-room; at the other end is a messroom. The new offices provided for the Chief Constable in connexion with the house occupy a portion of this part of the site reaching to Downing-place. The only other rooms in the police-station are the clerk's office, waiting-room, and general storeroom, on the right of the first-floor landing. The first two named are about 12 ft. square, and the storeroom extends over both rooms. At the south end of the site is the fire-station, access to which is obtained by means of a bold semi-circular arched doorway, fitted with folding doors. The fire station, which has a wood-block flooring, is 30 ft. by 24 ft. and affords accommodation for a steam fire-engine and any equipment the town may require for its brigade. Upon entry, on the left is the watch room, in telephonic communication with all the call-posts in the town. Through the station is an open yard, to be used for cleaning and repairing purposes, and measuring some 30 ft. by 20 ft. It is paved with granolithic, and is provided with a hose hoist. At the rear of the yard is a muster room 20 ft. by 16 ft. and 12 ft. high. It has a wood-block floor, and is adorned by a wood dado about 4 ft. from the ground. This completes the ground floor, and the first and second stories contain the quarters of the foreman fireman. Both stations are furnished with electric light, electric bells, and telephones, the installation having been carried out by Messrs. Baily, Grundy, & Barrett, Limited, of Cambridge. The architect of the buildings is Mr. John Morley, of Cambridge.

SANITARY AND ENGINEERING NEWS.

MELTHAM SEWERAGE.—A Local Government Board inquiry was recently held by Colonel A. E. Durnford, R.E., into an application of the Meltham Urban District Council for consent to deviate from the chemical purification scheme of sewage treatment for which a loan was sanctioned in 1899. It was stated by the Council's Solicitor, Mr. F. A. Reed, that the scheme previously sanctioned consisted of chemical precipitation followed by artificial filtration and subsequent land filtration, but the Council now desired to substitute in place of that the Polarite bacterial oxidation system, which would be more suitable for the requirements of the district than the scheme previously sanctioned, whilst the advantages to be obtained from it, in addition to greater efficiency, were that the use of chemicals would be dispensed with, the works would be automatic, and there would therefore be a considerable saving in labour. Mr. J. B. Abbey, of Messrs. Abbey & Son, of Huddersfield, the Engineers to the Council, produced the plans of the proposed works and described the system, which briefly consists in passing the sewage through a screening tank, and then into three detritus tanks, where the organic solids will become split up and disintegrated by the liquefying action of the bacteria present. From the detritus tank the sewage enters three anaërobic bacteria beds, the effluent from which will flow along aërating channels, and then be sprinkled by means of Candy-Caink automatic revolving sprinklers fed by automatic intermitters on to Polarite bacterial oxidation beds. These beds have a com-

bined area of 504 square yards with a working depth of 3 ft. 6 in., and will deal with 240,000 gallons of sewage per day. The advantage of delivering comparatively small quantities on the beds with short intervals of rest (which is accomplished by means of the Candy patent intermitters and automatic revolving sprinklers) is that a more complete aëration of the effluent as well as filter bed is obtained, and consequently a higher degree of purification, than by thoroughly deluging the beds and giving longer intervals of rest. Experience has also proved that better results are obtained by sprinkling than by either continuous distribution or ordinary contact beds. Mr. Candy, of the International Purification Syndicate, who was called to give evidence with regard to the Polarite oxidation beds and the working of the patent intermitters and sprinklers, stated in reply to inquiries that there were no royalties in connexion with the use of the system, which was being extensively adopted in various parts of the country as well as abroad. Dr. Wilson, Chief Inspector of the West Riding Rivers Board, was in attendance, and expressed the opinion that this was one of the most complete schemes he had seen submitted by any District Council, and urged that the work should be put in hand forthwith, the intercepting sewers having already been completed.

PROGRESS OF THE BIRMINGHAM NEW WATERWORKS.—The water committee of the Birmingham Corporation have recently made a report on the progress made in the Welsh Water scheme. Also, they state that in regard to the present supply the total consumption during the half-year, to September 30, shows a considerable increase over the corresponding period of 1900, having averaged 19·2 million gallons per day against 18·1 million gallons last year. The maximum day this year showed a consumption of 24,297,000 gallons against 23,588,000 gallons last year. With the exception of a few days at the end of July, when there was shortage in some districts, the supply has been well maintained throughout the summer. The rainfall, although considerably below that of last year in total, has nevertheless been well distributed, there having been no prolonged drought throughout the summer. Turning to the Elan Valley (Welsh) supply the committee give figures which show that the following purchases of land have been made:—Freeholds, 10,324 acres; common and exclusive rights, 24,587; mineral or mining rights, 5,879; manorial rights, 36,903. Good progress has been made during the summer with the works in the Elan Valley, and on the various sections of the aqueduct, also at Frankley, and in connexion with the laying of the distribution mains, but in the cases previously referred to, in which the work is behind time, the arrears have not yet been made up. The committee defer giving exact particulars as to progress until the reports to the end of the season have been received. By the Corporation Water Act of 1892 the time fixed for the completion of the works in the first instalment is ten years from the passing of the Act, which will expire on June 27, 1902. It will be impossible to complete all of the works by that date, and it will therefore be necessary to apply to Parliament for an extension of time. The Committee accordingly propose that the Corporation shall promote a Bill in the 1902 Session of Parliament to obtain such extension of time, together with a corresponding postponement of the sinking fund in respect of the capital raised under the 1892 Act. They further propose that advantage shall be taken of the occasion to obtain Parliamentary sanction to the abandonment of certain works found to be unnecessary, and the substitution of others to replace in certain cases, none of the variations proposed being in themselves important.

NEW BRIDGE, NEAR EDINBURGH.—The new "Shank" bridge on the main road from Newtonloan to the Shank at Armiston has now been completed. It has been erected on the site of an old bridge, and it was found by the engineers that the piers of the latter, which are very massive, could be repaired, and it was therefore decided only to take down the arches to the springing level, and to erect braced stools upon them for carrying the girders. These stools are about 28 ft. high, and are formed of four rectangular columns braced together and bolted to granite-bearing stones built into the piers, which have been thoroughly repaired. A bearing girder is fixed on the top of each stool, on which the longitudinal girders rest. The superstructure consists of two longitudinal plate girders, on the top of which trough flooring is laid, and there is a lattice parapet on each side. Cement concrete is laid in and over this troughing, and the roadway is formed of tar macadam, with tar paving on the footway. Cast-iron pilasters are placed over each pier, and castellated masonry pilasters on the abutments at either end of the bridge. The spans of the girders are about 47 ft., and the width of the bridge is 28 ft. between the parapets, divided into a roadway 20 ft. wide, with a footpath on one side 6 ft. wide and a cess of 2 ft. on the other side. The total length of the new bridge is about 320 ft., and the roadway is upwards of 60 ft. above the channel of the Gore Water. Messrs. Findlay & Co., of Motherwell, in conjunction with the engineers, Messrs. Crouch & Hogg, of Glasgow, were responsible for carrying through the work. The subcontract for the removal of the old bridge and the erection of the new masonry was placed with Mr. Stephen Hair, builder, Dalkeith, and the tar macadam and paving were done by Messrs. W. Walker & Sons, Leith and Ayr.

STAINED GLASS AND DECORATION.

ST. ANDREW'S ROMAN CATHOLIC CHURCH, BRAEMAR, N.B.—This church is about to be greatly improved and renovated. The work, which will take more than six months to execute, has already been begun, a number of stained windows having been inserted. The window at the end of the church, behind the altar, is a three lancet one. The centre light consists of Christ Crucified, with the Blessed Virgin and St. John, illustrating the text, "There stood by the Cross of Jesus his mother and the disciple whom Jesus loved." The light on the left is St. Andrew, the patron saint of the church. The figure is drawn from a photograph of the banner taken by the Scotch pilgrims to Lourdes in 1899. In the background to the right is a view of the Cathedral of Iona, and on the left St. Oran's Chapel. The light on the right represents St. Margaret, patroness of Scotland, and is taken from an altar piece in the Scots College, Rome, painted by a Polish artist. The saint is represented in prayer to the Holy Trinity. In the background is to be seen a view of the Battle of Alnwick, where were killed her husband, Malcolm Canmore, and her son. The two side windows in the sanctuary represent two Scotch saints—St. Columba and St. Ninian—and they are also from a painting in Rome by Seitz, an artist of the school of Overbeck. The whole of the work was executed by Mr. Louis Grosse, Bruges, Belgium, and of the firm of Louis Grosse, London. The emblems of Scotland—the thistle and crown—are delicately interwoven into the robes of the national saints. Other improvements are to be effected in the sanctuary, which is to have a new altar and surroundings, all of oak. The porch is to be laid with mosaic, representing the figure of St. Andrew in the centre, and between that and the outer border the Scotch thistle will be depicted. The passages will be laid in coloured tiles.

MEMORIAL WINDOW, ST. LUKE'S CHURCH, ISLINGTON.—On the 18th inst. a stained glass memorial window was unveiled in this parish church. The window, which is in the south-east corner of the church, represents St. James, and underneath is a suitable inscription to the memory of the late rector of the parish. The work was executed by Messrs. Jones & Willis, of Great Russell-street, Bloomsbury.

FOREIGN.

FRANCE.—M. Edouard Lecœur has been elected President of the Société des Architectes of the Seine for the ensuing Session.——The new Hôtel de Ville at Tours, the work of M. Laloux, is nearly finished, and will be opened next year. It has cost nearly 3,000,000 fr. without counting the artistic decoration, which is to be done at the cost of the State. The principal façade fronts the Place du Palais de Justice. It is decorated with sculptured caryatides by M. Sicard. The base of the campanile is adorned with two figures representing the Loire and the Cher, the work of M. Injalbert. Four figures by M. Cordonnier and M. Hugues, seated on the pediments of the gables, represent "Force," "Glory," "Science," and "Vigilance." Internally, the grand vestibule is decorated with four statues representing four celebrities of Touraine, viz., Cardinal Brissonnet, the painter Jean Foucquet, Maréchal Boucicaut, and Paul Louis Courrier. The Salle des Fêtes has two monumental chimney-pieces executed by M. Varenne, surmounted by two busts, by M. Injalbert and M. Loiseau Bailly, which represent "The Republic" and "Touraine." M. Schommar has been commissioned to paint the ceiling of this large room, and in the salle-à-manger will be placed eight compositions commissioned from two painters, MM. Eugène Thirion and Cormon. A triptych by M. Jean Paul Laurens will decorate the council-room, and the decoration of the committee rooms and the Mayor's parlour has been entrusted to M. Henri Martin. Considering all this exceptional talent engaged on the decoration of a building, designed under an architect of such remarkable acquirements as M. Laloux, it can be readily understood that the new town hall of Tours is no unimportant addition to modern French art.——There are to be important public improvements carried out in the town of Constantine, at an expenditure of a million and a half of francs; including the completion of the Hôtel de Ville.

INDIA.—The railway from Calicut to Cannanore has been completed and will shortly be opened for traffic.——The water supply to Rangoon has been considerably augmented by the sinking of two tube wells, which yield freely.——The extension works on the Nilgiri railway from Coonoor to Ootacamund have been commenced.——Traffic has been much interrupted on a portion of the Burma Railway from Mandalay to Kunlon by the destruction of a bridge between Sedaw and Tanbo by floods.——In regard to the Northern Railway of Ceylon, we learn that the laying of rails has been carried for several miles beyond Jaffna, and the ballasting has been done as far as Innuville.——The Brush Co. are preparing to take over the Bombay tramway system and to convert it to electric traction.——The Viceroy contemplates placing a tablet or device, with a suitable inscription, on old houses in Calcutta which have historical associations.

GERMANY.—It is anticipated that the monuments to be erected to the memory of the late Emperor and Empress Frederick in front of the Brandenburg Gate will be unveiled next October. The Empress Frederick will be represented in her coronation robes, and with the crown on her head. Herr Fritz Gerth, the sculptor, is now, or has lately been, in Berlin in order to discuss the plans with Herr Ihne, the Court Architect. The Emperor has decided that busts of Herr Eduard Zeller, the historian, and August Wilhelm von Hofmann, the eminent chemist, shall be placed at the foot of his mother's statue. —— The Emperor Frederick's monument, by Herr Brütt, is nearly finished. He is represented in the uniform of his consort's Cuirassiers. The pedestal of this statue will be adorned with busts of Professor Helmholtz and Field-Marshal Count Blumenthal.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Howgate & Keith, architects and surveyors, have removed their offices from 70, Gower-street to 10, Sackville-street, Piccadilly, W. ——Mr. J. R. Elliott, Civil Engineer, Nottingham, has removed to Burton Buildings, Parliament-street, Nottingham.

WORKHOUSE EXTENSION, GRIMSBY. — Messrs. Shorland ask us to mention that in the above-named building, described in our last issue, the wards are warmed and ventilated by means of their Manchester stoves.

NO. 2, PALACE-GREEN, KENSINGTON.—The Crown lease of this house, with some freehold garden ground at the back, will be offered for sale at auction in the course of next month. It stands on the west side, at the south end of the road, formerly Queen's-road, through Kensington Palace-gardens, and is the house, though somewhat altered since, which Thackeray built for his own occupation. He, it is said, made a scheme for the general plan and design. Thackeray removed thither from No. 36, Onslow-square, South Kensington, in 1862, and there he died on Christmas Eve of the following year.

ANCIENT TRADE REGULATIONS AT BEVERLEY.—A report which has just been issued by the Historical Manuscripts Commission on the Manuscripts of the Corporation of Beverley contains many curious and informing extracts from the ordinances in force in the ancient Yorkshire town in the middle of the fifteenth century. Some of them concern individual trades. Here are a few specimens:—No carpenter or tiler (viz., "tilethakker, tilewaller, and plasterer"), who has not a regular apprentice who works with him, to employ a journeyman without the consent of the master of the works with whom he works, and the latter may employ any journeyman he pleases, and finish a job begun by one with another. Carpenters, tilers, and their servants, sawyers, paviours, and their servants and workmen, shall observe these hours:—From Easter to the Assumption (August 15) from 4 a.m. to 7 p.m., with an interval at 6 a.m. of quarter of an hour to drink; at 8 a.m. of one hour for breakfast; at 11 a.m. of one hour and a half to dine and sleep; at 3 p.m. half an hour to drink; otherwise they shall not be tardy, or absent from their work, on pain of 12d. to the community. From the Assumption to Easter they shall begin at daybreak, and leave off when the light fails. At this season they may have at 9 a.m. half an hour to drink or breakfast; 12 noon, one hour to eat; 3 p.m., quarter of an hour to drink. No carpenter, &c., shall refuse to work with any burgess who wants him unless previously engaged on some other work; penalty, 6s. 8d. On account of the stink, fouling of the air, and destruction of fruit trees, none to make a kiln ("thorale") to burn bricks ("tegularem") in or nearer the said town than the kilns are now built; penalty, 100s.

TIMBER EXPORTS FROM THE WHITE SEA.—A report received by the Foreign Office from Sir Capel Wolseley, British Vice-Consul at Archangel, supplements in some respects the more elaborate review of the Russian timber trade sent recently by Mr. Consul Woodhouse from Riga, as already noticed in the *Builder*. Sir C. Wolseley states that the export of timber from all the ports of the White Sea amounted last year to 10,323,085 roubles (1,098,200*l.*), being 2,000,000 roubles in excess of the previous year. The vast forests of the Province of Archangel are its most valuable commercial asset and the principal source of the prosperity of its ports. With occasional fluctuations, the development of the timber trade has been steady and rapid. Between 1862 and 1880 the export nearly doubled in the course of each decade. During the next ten years the increase was about 70 per cent. The export of 1900 was nearly twice that of 1891. Since 1898, which showed a slight decrease as compared with the previous year, the advance has been at the rate of about 200,000 standard dozens yearly, while the increase of value was about 140,000*l.* in 1899 and over 210,000*l.* in 1900,

the total amount of timber exported in that year being 1,239,068 standards, valued at 1,098,200*l.* The exceptionally high prices obtained for sawn timber in 1899 still continued to prevail last year. The logs having been bought at moderate rates, large profits ensued for the saw-mill owners. A result of this access of prosperity was to cause some owners to start new mills and to bring competitors into the field. The new mills comprise two at Archangel, two at Kovda, one at Umba, one in the Petchora district, and two small ventures inland near the line of the Moscow-Yaroslav-Archangel Railway. Another effect of the two years' run of prosperity was to increase the price of logs. The Russian Government, to whom all the forests belong, only offer a limited number of trees for sale by auction each year. Last year, buyers, anticipating a continuation of the larger demand for sawn goods, strove to outbid each other in order to obtain the greatest number possible of the available trees, the result being that unprecedentedly high prices were paid. As the timber is generally allowed to lie two years in order to become seasoned, the result of this high rate of purchase will not be felt till 1902, when, unless the market improves, it appears inevitable that many owners will suffer loss.

The Merwarth Metallic Gasket.—Gaskets, or joint rings for flanged pipes and unions, are sufficiently familiar to architects and engineers, and of late years the tendency has been towards the employment of metal as the most efficient and serviceable material. The "Merwarth" ring is of somewhat novel construction, consisting of a soft metal ring of $\frac{1}{8}$-in. diameter wire, outside which is soldered a concentric copper ring of $\frac{1}{16}$-in. diameter wire, and to the copper ring short pieces of thinner wire are attached, which can be wound round the bolts for the purpose of holding the gasket in the proper position for making a joint. No doubt in very accurate work there is nothing better than a "metal-to-metal" joint, but in the case of ordinary pipes the flanges always present irregularities, even when machine-faced, and the use of some compressible yet durable material is always necessary. The device with which we are now concerned appears to be a good one, for the inner ring of metal being ductile, is readily squeezed into all the irregularities of the flange surfaces, and thus forms a perfectly tight joint, preventing the leakage of liquid, vapour, or gas, and being reinforced by the outer ring of copper it is capable of resisting injury from expansion, contraction, and vibration. The gaskets are made up to 60 in. in diameter, and it is claimed for them that efficiency increases in direct proportion to the diameter. This is an unusual condition, and one of which we cannot yet speak from practical experience. Other clear advantages are that the rings do not deteriorate and can be used over and over again, whilst they can be removed and replaced in a minimum space of time.

Central School for the Blind in London.—A scheme is under consideration for the establishment of a Central School for the Blind in London. Although provincial cities were the first to undertake the instruction of children thus afflicted, the Metropolis subsequently took the lead, and a comprehensive and systematic plan was prepared by the School Board. The blind children attend the schools, but receive special instruction, given by a superintendent and several teachers trained at the Royal Normal College for the Blind. The proposed central school is situated at Bolingbroke-grove, Wandsworth Common, and correspondence on the subject has been passing between the School Board and the Education Department. Some alterations are required on the premises, which are known as Linden Lodge, and when these are completed the Department has undertaken to grant a permanent certificate.—*Daily Telegraph.*

New Church for South Kensington.—The Ecclesiastical Commissioners have decreed the union of the two contiguous benefices of All Saints and Holy Trinity, Knightsbridge, and the demolition of the latter church, together with the vicarage adjoining. The united benefices will in future be served by the Church of All Saints, in Ennismore-gardens, which was erected some fifty years ago, and subsequently enlarged. The interior contains some decorative work by Owen Jones. In order that the spiritual needs of the district shall be fully supplied, it has been decided that a new church, together with a parsonage house, shall be built in Prince Consort-road, South Kensington, upon a site purchased from the Commissioners of the Great Exhibition. Mr. G. F. Bodley has been appointed to prepare the plans.—*Daily Graphic.*

Giggleswick School Chapel. — The Acme Wood Flooring Company ask us to mention that the wood-block flooring in the above-named chapel was laid by them, with the "Immovable-Acme" system of dovetailed blocks.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

11,429.—An Electro-Magnet for Use in Lifting Apparatus: *M. Vogelsang and F. Lindenstruth.*—An automatical switch and an electro-magnet are so combined that a strong current shall be firstly sent through the coil for starting the motion of the armature, after which the current will be weakened. An extension upon the core or armature, which is surrounded with the coil, will, concurrently with the attraction of the armature, move a switch lever in opposition to the action of a spring, and so effect the insertion of a resistance, which may be inserted either in series or parallel-wise to the coil.

11,438.—Jointing Cases for Electrical Conductors: *Siemens Bros. & Co., W. Dieselhorst, and F. J. Budd.*—Two castings fitted together and secured with bolts and nuts constitute a casing for straight, T, or multiple joints. For the first-named the cable is gripped in the lower case or casting, and there are provided an air space for some low-melting-point insulating material, and channels for projections upon the upper casting. One of the channels takes a packing of strip lead, the other takes insulating material. The air holes and filling holes are to be closed with screws.

11,442. — Portable Buildings and their Parts: *C. H. Rector.*—These structures, which are intended for use as hospitals and for military and other purposes, have foundation beams, rebated floor sections, wall and roof sections of composition board, and rafters and uprights of T or double-angle iron. Scarfed joints and interlocking lugs and slotted plates join sections of the beams together in line, the rafters being pivoted to triangular brace plates which are riveted to the uprights and are secured to the plates with slotted pins or bolts tightened and locked with slotted wedge plates sliding upon pins of the bolts; to the uprights and rafters are affixed inclined lugs for engagement with the slotted side bars of the frames that support the wall and roof boards; sockets on the king posts at the gable ends carry the brace plates of the end roof trusses, and transport is facilitated by the jointing of the ridge bar. At the ridge are triangular brace plates riveted to the rafters upon one side of the roof, upon the other side they are joined to the rafters with pivots and slotted bolts; pivoted catches or levers passed through slots in the uprights and inserted into inclined wedging-slots in the sash stiles fasten the windows between the uprights. The specification provides for dividing the building into rooms by means of partition plates.

11,453.—Kilns, Ovens, Drying-floors, &c.: *J. T. Cope.*—A series of hot-air, furnace-gas, or steam-flues or ducts having triangular sections that present a set of furrows, ridges, or corrugations, constitutes an open drying-floor, or the floor of an oven or kiln. The flues may be made in lengths, whereof each is either in one piece or built up with tiles or plates, or they may be formed of some woven material upon ribs or frames. In one shape the flue is made of pierced tiles and is open at the base; clamps or shoes support its lower ends, and pierced filling-pieces lie in the furrow angles, the tiles interlocking at the ridge-tops.

11,510.—Siphonical Discharge: *E. Grube & H. C. M. Sanny.*—To a bell-siphon is attached the open-bottomed float of the supply-cock. When the pull-chain is pulled the float will be pressed downwards until the water overflows for the starting of the siphon. The inventors also contrive that the float shall act as a piston.

11,515.—A Parallel Ruler: *D. T. Stokes.*—In the body of the ruler are openings in which is fit a shaft mounted with rollers, and a bevelled ruler (to which a combined folding square and protractor may be attached) runs upon the rollers, a spring catch controls the extent of the movement of the ruler between the ruled lines, and the catch is to be moved along a spindle into gear with one of a row of teeth or grooves upon a boss. For use with papers, &c., that have different widths, one roller, or both of them, can be adjusted upon the shaft by means of a spring click in the roller that will engage with scallops cut in the shaft. The rollers are made of side-plates drawn together with a screw-hub upon their middle rubber portions.

11,523.—An Exhaust Ventilating-shaft Top: *J. R. Arnoldi.*—An open-ended draught-tube is placed within a passage which is affixed at 90 deg. to the up-take. The tube and the passage may be flared or may have one continued diameter, and the former will extend from one end of the passage to beyond the opening of the up-take. The draught-tube is lipped, and inside the passage is disposed transversely a raised ridge, groove, or ring for preventing the entrance of rain by the up-take. In another form the passage and tube are set upon a vertical spindle that they may be turned by the wind.

11,543.—Domestic Hearths: *W. L. Dennis.*—The hearths consist of enamelled and embossed metallic plates secured on asbestos or other non-conducting pads; their corners are closely pierced in order that portions may be cut off them so as to fit the stove without injury to the enamel. The plate may be fashioned with extensions to be bent so as to make a combined hearth-plate and curb, or it may be affixed on to a fender or curb.

11,553.—Locks: *P. Stephens.*—Between the door and the lock is a recess for a plate on which slides another plate that closes the outside keyhole; the latter plate is maintained in its position by means of a bail which is pivoted on to the knob and abuts against the turned-up part of the covering-plate, and it may be caused to slide into its place, when the key is in the lock on the inside of the door, by means of a groove that is cut in its middle.

11,569.—Process of Moulding Bricks: *J. S. Pullan and W. H. Mann.*—A loose cutting ring or frame is fitted on to the feeding-hopper of the machine specified in No. 935 of 1896; its bevelled cutting edge will be pressed downwards against the mould or table by the pressure of the clay; close contact of the cutter against the table is brought about by its being forced down automatically as the underside is worn away.

11,594. — A Hand-tool for Setting the Teeth of Saws: *H. U. Kistner.*—Two jaws hold the saw which a gauge adjusts lengthwise; when the handles of one of the jaws are pressed together the jaw will be pressed against the saw, and then punches are forced against the opposite sides of the teeth. A pivoted lever, together with a curved lever, a link, a spring, and a third lever effect the working of the handles upon the jaw, and the pressure is extended to the punches which are joined to the opposite sides of a fulcrum. For saw-jointing purposes a screw is drawn back for the insertion of the saw, and a file is operated within a recess.

11,606.—A Lift Valve: *G. O. H. Klopp and Klopp's Patents, Limited.*—For a cock or tap wherein the fluid pressure from below presses a ball-valve against a seating-ring, a ring which is fashioned in one piece with a sleeve keeps the seat in its position, and its turning is prevented by means of a side-lug that engages with a groove in the casing, in which it is held with a cap; water will escape through a channel and a port in the casing and the sleeve, and a rib in the bib or outlet obviates spraying. Confer also No. 8,386 of 1898 for the cock or tap cited.

11,609-10.—Protective Contrivances for Use with Electrical Circuits and Systems: *P. H. Thomas.*—In order to prevent damage by excessive static potential, the inventor connects the leads of a system with lightning-arresters, which are set in series with earthed impedances; one shunting impedance, or more, can be used in each of the arresters, which consist of a series of spark-gaps variously unshunted, or shunted with impedances. No. 11,610 specifies a system of which the generator has impedances in the leads, condensers, and lightning-arresters that are bridged across the leads and connected to earth. For protecting the transformer from a rise in potential occasioned when the switches are opened are provided impedances and condensers bridged across the leads and connected to the transformer core. For a direct-current system it will be necessary to protect one side only with the impedance and arrester.

11,632.—A Sewage Strainer or Screen: *S. H. Adams.*—A flap is provided for a basket-shaped strainer or screen for the collection of the separated solid matters. The flap can be pulled upwards with chains so as to leave the solid matters in the basket, which also is to be lifted up for the removal of its contents, a screen being then lowered into the place of the basket.

11,638.—Chimney-tops: *A. Z. Germains.*—The inventor's object is to supply a chimney-top for use with furnaces in order to save fuel and consume smoke. Between the two parts (covered with a hood) which constitute the upper portion of the top, is a perforated ring-damper, which is worked with a lever and a chain; a set of small rotatory fans are disposed around the upper part, a socket hangs from the lower part into the shaft beneath; the opening between the two portions is regulated with a sleeve to which a lever and a chain are attached. Confer also No. 315 of 1898.

11,666.—A Method of Setting-out Curves: *H. Fischer.* — The instrument is devised for the setting-out of circular curves. It has a diametrical arm which carries slot-and-wire sights and is pivoted on to a graduated disc which has two fixed base-line sights. For setting-out a particular arc *a b*, one should firstly set out the diameter *a e* (of the circle) in both length and direction, then one should set up the instruments at the extremities *a* and *e*, with the base sights along *a e*, the diametrical arms being set to complementary angles; points along the curve *a b* will then be given by the intersection of the lines of sight.

11,798.—Construction of Brick and other Kilns, Retort Furnaces, &c.: *E. Böttger.*—The arches are built up with hemispherical bricks at the two ends, segmental bricks at the vault, and recessed bricks, with it may be central key-stones at the crown.

11,852.—Kilns and Drying-floors: *Meldrum Bros. and J. S. Orton.*—There are external furnaces in communication with flues beneath the floor, which latter should be constructed of removable slabs or tiles; two or more floors can be laid in series at different levels and be heated by one furnace or by separated furnaces. The invention concerns the manufacture of Parian cements, plaster of Paris, and barytes and china clay.

11,889.—A Contrivance for Working Valves, Cocks, Switches, &c., from a Distance: *L. Feldmann and L. Korach.*—A cylinder, which contains a spiral spring, is mounted upon the casing of the pipe, a link joins a bell-crank lever to the valve-handle, its axis being in engagement with one end of the spring; the free end of the lever will engage with a catch upon a pivotted lever supporting a plate. When the former lever is turned through 90 deg. the plate acts as the armature of electro-magnets that are connected to a battery circuit.

When the circuit is closed with a switch, the electro-magnets will attract the plate for release of the bell-crank lever to enable the spiral spring to return the valve to the closed position. A plate inscribed "closed" may be worked with a shunt circuit joined to an electro-magnet.

MEETINGS.

SATURDAY, OCTOBER 26.

The Builders' Foremen's Association (Memorial Hall, Farringdon-street).—7.30 p.m.

British Institute of Certified Carpenters.—Visit to St. Thomas' Hospital, Albert Embankment. 3 p.m.

TUESDAY, OCTOBER 29.

The Sanitary Institute.—Professor Henry Robinson, M.Inst.C.E., on "Sewage Disposal." Parkes' Museum. 7 p.m.

WEDNESDAY, OCTOBER 30.

Northern Architectural Association. — Students' Sketching Club, Winter Lectures, proposed Association Conversazione, 36, Northumberland-street, Newcastle-upon-Tyne. 7.30 p.m.

THURSDAY, OCTOBER 31.

Carpenters' Hall.—Professor T. Roger Smith on "The Supply, Distribution, and Use of Water in Buildings." 7.30 p.m.

The Sanitary Institute.—Professor Henry Robinson, M.Inst.C.E., on "Scavenging, Disposal of House Refuse." Parkes' Museum. 7 p.m.

FRIDAY, NOVEMBER 1.

Architectural Association. — Mr. A. Wood, M.A., F.S.A., on "Cambridge in Early and Mediæval Times." 7.30 p.m.

Institution of Junior Engineers.—Presidential address by Sir John Jackson F.R.S.E., Westminster Palace Hotel. 8 p.m.

Institution of Mechanical Engineers.—Adjourned discussion on the Second Gas Engine Research Report. 8 p.m.

SATURDAY, NOVEMBER 2.

British Institute of Certified Carpenters.—Adjourned discussion on Mr. Sweett's paper on "Modern Joinery." 6 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 8, 9, and 10.—By S. WALKER & SON (at Torquay).

Torquay, Devon.—Hesketh-cres., f.g r.'s 112*l.* 6s., reversion in 43¼ yrs.	£4,100
Meadfoot-rd., f.g.r. 8*l.* 10s., reversion in 43 yrs.	390
Park-pl., &c., f.g.r.'s 36*l.* 9s. 6d., reversions from 19 to 42 yrs.	3,380
Hillside Cottages, &c., f.g.r. 5*l.* 2s., reversions in 50 and 66 yrs.	147
Tor Hill-rd., f.g.r.'s 29*l.* 17s., reversion in 36 yrs.	1,250
Bronshill-rd., &c., f.g.r.'s 105*l.* 17s., reversions from 20 to 89 yrs.	5,121
St. Mary's Church, &c., f.g.r. 22*l.* 6s., reversions from 11 to 64 yrs.	997
11, 12, 25, and 26, Torwood-st., u.t. 73 and 86 yrs, and subject to three lives	1,050
2 and 20, Victoria-parade, u.t. 83 and 87 yrs., and subject to three lives	775
1, Strand, u.t. 74 yrs., and subject to three lives	180
East-st., Rose Cottage, u.t. 77 yrs., and subject to three lives	120
East-st., a freehold building site	46
Upton, &c., 18 building sites, 7 a. 3 r. 22 p., f.	2,320
Higher Mount Hermon, &c., 14 building plots, 7 a. 2 r. 2 p., f.	2,000

October 14.—By HENRY HOLMES & CO.

Hampstead-rd.—30, Edward-st., u.t. 23 yrs., g.r. 8*l.*, r. 56*l.*	660

By HUGH SWORDER.

Epping, Essex. — Kendal-av., Gilstead and Elsternwick, f., r. 48*l.*	360

By G. A. WILKINSON & SON.

Hoxton.—63, Britannia-st., f.	900
Regent's Park.—47, York-ter., u.t. 19¾ yrs., g.r. 39*l.* 6s.	360
Chester-pl., i.g.r. 35*l.*, u.t. 23 yrs., g.r. 5*l.*	290
St. John's Wood.—Abbey-rd., &c., i.g.r. 30*l.*, u.t. 16 yrs., g.r. nil	1,560
Marylebone.—69, Marylebone-lane, f., r. 73*l.* 10s.	1,640
73, Marylebone-lane, f., r. 75*l.*	

October 15.—By DANIEL WATNEY & SONS.

Goudhurst, Kent.—Finchurst and Monk's Farms, 113 a. 0 r. 3 p., f.	4,600
Two enclosures of land, 12 a. 1 r. 38 p., f.	380
A freehold house, cottage, and 8 a. 0 r. 4 p.	650

By ALFRED BEST & ADAMS.

Balham.—21, Cloudesdale-rd., u.t. 89 yrs., g.r. 6*l.* 10s., e.r. 40*l.*	405

By J. & W. JOHNSON & CO.

Enfield.—1 to 4, Fir Tree-villas, f.	1,150

By MIDDLETON & CRACKNELL.

Hampstead.—34, Heathurst-rd., u.t. 94 yrs., g.r. 12*l.* 5s., e.r. 75*l.*	855

By J. W. MORLEY & CO.

Putney.—100, High-st., f.	2,000
102, High-st., with building in rear, f., r. 80*l.*	3,000

By WESTON & SONS.

Brixton.—9, 11, 13, and 15, Probert-rd., u.t. 71 yrs., g.r. 21*l.*	1,325

By WM. WEATHERHEAD (at Skipton).

Scosthrop, Yorks.—Dykelands Farm, 271 a. 2 r. 10 p., f.	6,100
Scosthrop Hall Farm, 205 a. 0 r. 20 p., f.	4,550

By ALFRED RICHARDS (at Tottenham).

Tottenham.—1 and 2, Rose-cottages, f.	225
Edmonton.—9, Gloucester-rd., f.	290
Montagu-rd., a freehold building plot	78
Kenningham-rd., a freehold building plot	25

By BARKER, CATHIE, & FINCH (at Masons' Hall Tavern).

Whitstable, Kent.—High-st., the Bear and Key Hotel, f., with goodwill	6,700

October 16.—By BAXTER, PAYNE, & LEPPER.

Twyford, Bucks.—Charndon Great Wood and four enclosures, 254 a., f., with the manors of Twyford and Charndon	£1,900

By FOSTER & CRANFIELD.

Kensington.—4 and 5, Alma-ter., u.t. 58¼ yrs., g.r. 15*l.*, r. 130*l.*	1,260

By HERRING, SON, & DAW.

Kentish Town.—4, 6, 7, 8, 9, and 11, Belmont-st., f., r. 248*l.*	2,980

By A. MARTIN NEWCOMBE.

Battersea.—Orkney-st., the Royal Albert Park Tavern, u.t. 61 yrs., g.r. 8*l.*, r. 50*l.*	1,470
43, 45, and 47, Chatham-st., f., r. 110*l.* 4s.	1,200

By PROTHEROE & MORRIS.

Limehouse.—63, 65, and 67, Salmon-lane, and the Earl Cairns Mission Hall in rear, u.t. 22 yrs., g.r. 55*l.*, r. 133*l.*	420
Leytonstone.—51, Birkbeck-rd., f.	500

By DOUGLAS YOUNG & CO.

Wandsworth.—St. Ann's Hill, The Grove, f., r. 87*l.* 10s.	960
The Grove, Moulscombe House, f., r. 42*l.*	580
Deptford.—170 and 172, High-st., a building site, area 3,700 ft., let for 80 yrs., at per annum	35

By J. H. BRADWELL & SONS (at Nottingham).

Nether Broughton, Leicester.—A freehold farm, 108 a. 3 r. 14 p.	4,100
A freehold farm, 34 a. 3 r. 33 p.	1,900
A freehold homestead and 23 a. 0 r. 1 p.	1,100
Three freehold messuages and 10 a. 3 r. 22 p.	800
Seven closes of pasture land, 31 a. 0 r. 1 p., f.	1,620
Freehold house, yard, &c.	170

By NOTT, CARTWRIGHT, & ETCHES (at Feltham).

Feltham, Middlesex.—Alfred-rd., 47 plots of freehold building land (in lots)	472

October 17.—By H. J. BLISS & SONS.

Old Ford.—4 to 22 (even), Wendon-st., u.t. 65 yrs., g.r. 40*l.*	1,720
Bethnal Green.—Moss-st., f.g.r. 3*l.*, reversion in 2¾ yrs.	420
Mile End.—26, Allas-rd., u.t. 63 yrs., g.r. 4*l.* 4s.	462

By C. RAWLEY CROSS & CO.

Shepherd's Bush.—126, Coningham-rd., u.t. 63 yrs., g.r. 7*l.* 13s., r. 40*l.*	395
25, 27, and 31, Sulgrave-rd., u.t. 73½ yrs, g.r. 19*l.* 10s., r. 105*l.*	1,205

By FAREBROTHER, ELLIS, & CO.

Whitton, Middlesex.—Nelson-rd., 5 freehold cottages, area 3 a. 1 r. 26 p., e.r. 90*l.*	1,515
Bloomsbury.—18, Woburn-sq., u.t. 27 yrs., g.r. 28*l.*	910

October 18.—By HARDS & BRADLY.

Catford.—49, Holbeach-rd., f., r. 27*l.*	415

By MARTIN, CLARKE & CO.

Feltham, Middlesex.—2, Grove-villas, f., r. 26*l.*	275

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 12 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 10 0	,,	,, ,,
Facing Stocks	2 12 0	,,	,, ,,
Shippers	2 8 0	,,	,, ,,
Flettons	1 8 0	,,	at railway depôt.
Red Wire Cuts	1 14 6	,,	,, ,,
Best Fareham Red	3 11 0	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire	4 6 6	,,	,, ,,
Do., Bullnose	4 10 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 0	,,	,, ,,
GLAZED BRICKS			
Best White and Ivory Glazed Stretchers	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.	
Thames and Pit Sand	7 3	per yard, delivered.
Thames Ballast	6 0	,, ,,
Best Portland Cement	32 0	per ton, delivered.
Best Ground Blue Lias Lime	25 6	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s 6d. per yard, delivered.
Stourbridge Fire-clay in sacks,	28s. 0d. per ton at rly. dpt.

PRICES CURRENT (*Continued*).

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube,	deld. rly. depôt.
Bath ,,	1 7	,,	,,
Farleigh Down Bath	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,,	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale in blocks	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York in blocks	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super	at rly. depôt
,, ,, 6 in. Rubbed Ditto	3 0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 2 in. self-faced Ditto	0 9½	,,	,,
Hopton Wood (Hard Bed) in blocks	2	3 per ft. cube.	deld. rly. depôt
,, ,, ,, 6-in sawn both sides landings	2	7 per ft. super.	deld. rly. depôt.
,, ,, ,, 3-in. do.	1 2½	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor	11 5 0	per 1000 of 1200	at ry. dep.
,, best seconds ,,	10 15 0	,,	,,
16× 8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc	10 18 0	,,	,,
16× 8 best blue Portmadoc	6 0 0	,,	,,
20×10 best Eureka unfading green	11 2 6	,,	,,
16× 8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green	10 0 0	,,	,,
16× 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles	41 6	per 1,000	at rly. depôt
Hip and valley tiles	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles	4 0	per doz.	,, ,,
Valley tiles	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles	3 8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 10 0	16 10 0
Deals: best 3 by 9	13 10 0	14 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11 0 0	12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	,, ,, ,,
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	10 10 0
2 in. by 4½ in. and 2 in. by 5 in.	9 0 0	10 0 0
Foreign Sawn Boards—		
1 in. by 1½ in. by 1½ in.	0 10 0	more than battens.
¾ in.	1 0 0	,,
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	3 0 0	3 10 0

JOINERS' WOOD. At per standard.

White Sea: First yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
3 in. by 9 in.	22 0 0	23 0 0
Battens, 2½ in. and 3 in. by 7 in.	18 0 0	20 0 0
Second yellow deals, 3 in. by 11 in.	20 0 0	21 0 0
,, ,, 3 in. by 9 in.	18 0 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	14 0 0	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 10 0	15 10 0
Battens, 2½ in. and 3 in. by 7 in.	12 0 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	22 0 0	23 0 0
Do. 3 in. by 9 in.	19 0 0	20 0 0
Battens	14 0 0	15 0 0
Second yellow deals, 3 in. by 11 in.	15 10 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	15 0 0
Battens	11 10 0	12 0 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 10 0
Do. 3 in. by 9 in.	13 0 0	13 10 0
Battens	10 10 0	11 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 0 0	16 0 0
,, ,, ,, 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 0 0	13 0 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6

[See also page 375.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Application to be in
*New Art School	Hull Corporation	100*l.*, 60*l.*, and 40*l.*	Jan. 31
*New Buildings, and Laying-out and Fencing Field	Governors, Northampton School	25 guineas to second	No date
*Municipal Buildings	Stockport Corporation	Not stated	do.
*New Public Library	Kingston-on-Thames Corporation	Not stated	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Designs to be delivered
Raising Boundary Wall at Cardiff Infirmary		E. Seward, Architect, Queen-street, Cardiff	Oct. 28
Road Metal (900 tons)	Pontypridd U.D.C.	E. Rees, Surveyor, Council Offices, Pontypridd	do.
Three Shops, North-parade, Bradford		S. Jackson & Son, Architects, Tanfield Chambers, Bradford	do.
33 Houses, Abercwmboi, Wales	The Building Club	T. W. Millar, Architect, Mountain Ash	do.
Additions to Laundry at Workhouse, Fulwood	Preston Guardians	— Whitwell, Engineer, Union Offices, Preston	do.
Building at Pumping Station, Whitworth-street West	Manchester Corporation	Waterworks Engineer, Town Hall, Manchester	do.
Street Works, Grange-avenue, &c.	Harrogate Corporation	Borough Engineer, Town Hall, Harrogate	do.
Additions to Hospital, North Prospect	Devonport Town Council	Borough Surveyor, 30, Ker-street, Devonport	do.
Sewerage Works	Selby (Yorks) U.D.C.	B. McG. Gray, Civil Engineer, Town Hall, Selby	do.
Water Supply Works, Cairnbulg, Aberdeen	Deer District Committee	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	do.
Car Shed and Boundary Wall, Caister-road	Great Yarmouth Corporation	J. W. Cockrill, Surveyor, Town Hall, Great Yarmouth	Oct. 29
Additions to Nurses' Home, Isleworth	Brentford Guardians	W. H. Ward, Architect, Paradise-street, Birmingham	do.
Street Works, Folkestone-road	Dover Town Council	H. E. Stilgoe, Civil Engineer, Town Hall, Dover	do.
Sewerage Works	Mountain Ash U.D.C.	H. P. Linton, Town Hall, Mountain Ash	do.
Additions to Small-pox Hospital	Bedford Corporation	J. Lund, Borough Surveyor, Town Hall, Bedford	do.
Filter Beds, Ellastone, Staffs	Mayfield R.D.C.	J. Twemlow, Surveyor, Mayfield Grange, Ashbourn	do.
Sewage Disposal Works, Dipton	Annfield Plain U.D.C.	T. J. Trowsdale, Surveyor, Annfield Plain	do.
Street Works, Ely and Llandaff Yard	Llandaff & Dinas Powis R.D.C.	J. Holden, Civil Engineer, 35, St. Mary-street, Cardiff	do.
Building at Sewage Works, Woolfold	Tottington (Lancs) U.D.C.	L. Kenyon, Surveyor, 33, Chapel-street, Tottington	Oct. 30
Passage Works, Tattersall-road	Litherland (Lancs) U.D.C.	W. B. Garton, Surveyor, 25, Sefton-road, Litherland	do.
Museum, Winchester		Colson & Co., Architects, 45, Jewry-street, Winchester	do.
Additions at Workhouse, Crumpsall	Manchester Guardians	A. J. Murgatroyd, Architect, 23, Strutt-street, Manchester	do.
Road Metal	Erdington (nr. Birmingham) U.D.C.	H. H. Humphries, Engineer, Public Hall, Erdington	do.
Church, Stonyhill, Blackpool		H. Goldsmith, Architect, 63, Faulkner-street, Manchester	do.
Road Works, Caburn-road and Rutland-gardens	Hove Corporation	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Boundary Walls, Bowersdale Park, Seaforth	Waterloo (Lancs) U.D.C.	F. S. Yates, Civil Engineer, Town Hall, Waterloo	do.
Gates, &c., Sandheys Park		do.	do.
Additions to Schools, Bedford-road	Bootle (Lancs) School Board	T. Cox, Architect, 11, Dale-street, Liverpool	Oct. 31
Library, North-street	Keighley Corporation	Borough Engineer, Town Hall, Keighley	do.
Sewage Outfall Works, near Stockport	Bramhall U.D.C.	E. Sykes, Civil Engineer, 13, Warren-street, Stockport	do.
Shops, South Kirkby, near Wakefield	Colliery Company, Ltd.	Garside & Pennington, Architects, Ropergate, Pontefract	do.
Creamery, Low Bridge	Kilfinane (Ireland) Co-op. Dairy Soc.	J. C. Bennett, Kilfinane, co. Limerick	do.
Sanitary Fittings, &c., Middle Walk, North Shaw	Blackpool Corporation	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Additions to Market House, Market-street	Oxford Corporation	City Surveyor, Town Hall, Oxford	do.
Schoolroom, near Trevethin Church, Pontypool	Church Committee	T. Williams, Architect, Victoria-road, Pontypool	do.
Road Works, &c., Fergusson-road and others	East Barnet Valley U.D.C.	G. D. Byfield, Council Offices, Station-road, New Barnet	do.
Drainage Works, Hillingdon East	Uxbridge Guardians	Engineer, Corn Exchange, Uxbridge	do.
Well Sinking, High Hesket	Penrith R.D.C.	J. W. Smith, Council Offices, Penrith	do.
Water Supply Works	Knottingley U.D.C.	J. Richardson, Civil Engineer, East Parade Chambers, Leeds	do.
*Sorting Office for Postmen, Brockley	Commissioners of H.M. Works, &c.	J. Wager, H.M. Office of Works, Storey's Gate, S.W.	do.
Outfall Sewer and Sea-wall, St. Aldan's-by-the-Sea	Lord Crewe's Trustees	F. H. Anson, Civil Engineer, 15, Dean's-yard, Westminster	Nov. 1
Laboratory at County School, Cardigan		J. Stephens, 3, Queen-street, Cardigan	do.
Chapels, &c., Ballycraigy	Larne (Ireland) U.D.C.	W. G. Young, Town Hall, Larne	Nov. 2
Additions to Schools, near Doncaster	Stainforth School Board	H. B. Thorpe, Architect, Goole	do.
Road Works, Chingford Green	Chingford U.D.C.	W. Stair, Surveyor, 14, The Parade, Chingford	do.
Sewerage Works	Cowbridge (Wales) R.D.C.	G. E. Morris, Civil Engineer, St. Quintins, Cowbridge	do.
Arching over the Beck, near Market	Dewsbury Corporation	Borough Engineer, Town Hall, Dewsbury	do.
Villa, Forteath Avenue, Elgin		Sutherland & Jamieson, Architects, Elgin	do.
Underground Lavatories, Market Place	Carlisle Corporation	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
*Paving Works, Southend	Essex County Council	Chief Surveyor, County Offices, Chelmsford	do.
*Road and Sewer Works	Hornsey U.D.C.	E. J. Lovegrove, Southwood-lane, Highgate, N.	Nov. 4
Sewers, South Church	Bishop Auckland Rural Council	C. Johnston, Surveyor, Bishop Auckland	do.
Sewerage Works, &c.	Romford U.D.C.	J. Turvey, Surveyor, Market Place, Romford	do.
*Wrot-iron Fencing, Wandsworth Park	London County Council	Parks Department, 11, Regent-street, S.W.	do.
*Tarred Road Paving, &c.	Paddington Borough Council	Borough Surveyor, Town Hall, Paddington, W.	do.
*Surface Water Drainage	Bromley U.D.C.	Surveyor to Council, Bromley, Kent	Nov. 5
*Making-up Harold-road	Tottenham U.D.C.	W. H. Prescott, Engineer, 712, High-road, Tottenham	do.
Cottages	Mallow R.D.C.	Maurice Regan, Board Room, Mallow	Nov. 6
Sewers, Irishtown, Ireland	New Ross U.D.C.	J. W. Gardner, Civil Engineer, Council Offices, New Ross	do.
Drainage Works, Busby, Lanarkshire	Middleton (Lancs) Corporation	W. L. Douglass, Civil Engineer, 3, Clydesdale-street, Hamilton	Nov. 9
Paving Works, &c., Highfield-street, and others	Mansfield Town Council	W. Welburn, Borough Surveyor, Town Hall, Middleton	do.
*Electricity Works	Aston Manor U.D.C.	Vallance & Westwick, Architects, Mansfield	Nov. 11
*Electric Power Station	Ilford U.D.C.	R. P. Wilson, Engineer, 66, Victoria-street, Westminster	do.
*Tramway Car Sheds, Workshops, &c.	Commissioners of H.M. Works, &c.	Surveyor to Council, 7, Cranbrook-road, Ilford	Nov. 12
*New Public Offices, Westminster	Dover Union	Secretary, H.M. Office of Works, Storey's Gate, S.W.	do.
*Infirmary and Nurses' Home	Deal & Walmer Joint Water Board	Cresswell & Newman, 54, Castle-street, Dover	do.
*Additional Buildings at Pumping Station	Rev. J. Ferguson	H. & C. Hawksley, 30, Great George-street, S.W.	Nov. 13
*Iron Mission Church	Hull Joint Dock Committee		Nov. 15
*New Dock	Winchester Corporation	Sir John Wolfe Barry, 21, Delahay-street, Westminster	Dec. 6
*New Museum Buildings	Nottingham School Board	Colson, Farrow & Nisbett, 45, Jewry-street, Winchester	No date
*Residence and Stabling, Farnborough	Messrs. N. Rees & Sons	W. E. Trevena, Architect, Farnborough, Hants	do.
Additions to Schools, Stanley-road	Hambledon (Surrey) R.D.C.	J. N. Bromley, Architect, Queen-street, Nottingham	do.
Weaving Shed, Holbeck, Leeds		W. A. Hobson & Co., Architects, 82, Albion-street, Leeds	do.
Alterations to Cory's Corner, Bute-street, Cardiff		Jones, Richards & Budgen, Architects, 95, St. Mary-st., Cardiff	do.
Restoration of Warehouse, Working-street, Cardiff		do.	do.
Cottage at Sewage Disposal Works, Cranleigh		E. L. Lunn, Surveyor, 36, High-street, Guildford	do.
Eight Houses, South Moor-lane, Stanley		T. E. Crossing, Architect, Front-street, Stanley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Tenders to be delivered
*Town Hall Keeper	Finsbury Council	2*l.* per week, &c.	Oct. 30
*Clerk of Works	Stafford Union	Not stated	do.
*Sanitary Inspector	Lambeth Boro' Council	120*l.*	Oct. 31

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. & xxii. *Public Appointments, pp.* xix. & xxii.

PRICES CURRENT (*Continued*).

WOOD.

	At per standard. £ s. d.	£ s. d.
Dansig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 0
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 7
in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 3 0	0 3 6
Prepared Flooring—	Per square	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 16 6
1 in. by 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 1 0
6 in. at 6d. per square less than 7 in.		
1 in. by 7 in. white, planed and shot	0 11 0	0 13 0
1 in. by 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 7 in. white, planed and matched	0 14 0	0 16 6
6 in. at 6d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 15 0	7 15 0
Compound Girders " "	8 15 0	10 0 0
Angles, Tees and Channels, ordinary sections	8 12 6	10 12 6
Flitch Plates	8 15 0	9 10 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 5 0	9 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	9 0 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 15 0
" " galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	16 10 0	- - -
" " 22 g. and 24 g.	17 0 0	- - -
" " 26 g.	18 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 5 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 10 0	10 0 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 10 0	- - -
Pipe in coils	15 0 0	- - -
Soil Pipe	17 10 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	24 10 0	- - -
Silesian	24 0 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 0½	- - -
Thin "	0 1 2	- - -
Copper nails "	0 1 2	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin "	0 1 1	- - -
TIN—English Ingots "	0 1 3½	- - -
SOLDER—Plumbers' "	0 0 6½	- - -
Tinmen's "	0 0 8	- - -
Blowpipe "	0 0 9	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	3d. per ft. delivered.
" " fourths	2¾d. " "
21 oz. thirds	3¾d. " "
" " fourths	3½d. " "
26 oz. thirds	5d. " "
" " fourths	4¾d. " "
32 oz. thirds	6d. " "
" " fourths	5¾d. " "
Fluted sheet, 15 oz.	3¾d. " "
" " 21 "	4¾d. " "
½ Hartley's Rolled Plate	2¾d. " "
⅝ " " "	3¼d. " "
¾ " " "	3¾d. " "

PRICES CURRENT (*Continued*).

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 9
" " " in barrels "	0 2 10
" " " in drums "	0 3 0
Boiled " " in pipes "	0 2 11
" " " in barrels "	0 3 0
" " " in drums "	0 3 2
Turpentine, in barrels "	0 2 3
" in drums "	0 2 5
Genuine Ground English White Lead per ton	22 0 0
Red Lead, Dry "	22 10 0
Best Linseed Oil Putty per cwt.	0 9 0
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work	0 16 0
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 0
Best Hard Oak Varnish for inside work	0 10 0
Best Extra Hard Church Oak Varnish for inside work	0 10 0
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 0 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERCARN.—For the erection of chapel, caretaker's house, &c., for the Urban District Council. Mr. George Stevens, Surveyor, Council Offices, Abercarn :—

Ledbeter Bros.	£2,659	J. Jenkins	£2,579
Davis Bros., Abercarn*	2,648		

ASPATRIA (Cumberland).—For the execution of water supply works for the District Joint Water Board. Messrs. Pickering & Crompton, C.E., 11, Lowther-street, Whitehaven. Quantities by the engineers :—

FIRST SECTION OF WORKS.

Contract No. 1.—Supply of Cast-iron Pipes.

D. Y. Stewart, St. Rollox, Glasgow* £6,127 0 9

Contract No. 2.—Construction of Reservoir and Laying and Jointing Pipes.

John Laing, Melbourne-street, Carlisle* £5,524 13 9

Contract No. 3.—Stand-post and Lattice Bridge, Valves, Hydrants, &c.

Blataborough & Sons, Brighouse, Yorkshire* £265 6 3

CARDIFF.—For widening three bridges, for the Corporation. Mr. W. Harpur, C.E., Borough Engineer, Town Hall, Cardiff. Quantities by the Engineer :—

Heenan & Froude	£5,707 3 9	Dawnay&Sons	£4,967 15 1
Handyside&Co.	5,545 10 0	Baker & Co...	4,698 11 4
Finch & Co...	5,323 12 11	Westwood & Co.,Millwall*	4,366 14 5

CATERHAM-ON-THE-HILL (Surrey).—For alterations and additions to the Clifton Arms public-house, for Messrs. Page & Overton, Ltd. Mr. A. Broad, architect, 22, George-street, Croydon. Quantities by the architect :—

G. Cheeseman	£811	W. Potter	£630
W. Harman	796	C. E. Scrivener	614
Vaughan	690	D. W. Barker, Croydon*	613
Akers & Co.	655		

CROYDON.—For additions to Lansdown, No. 28, Wellesley-road. Mr. A. Broad, architect, 22, George-street, Croydon. Quantities by the architect :—

E. J. Saunders	£429	Akers & Co.	£367
W. Potter	382	D. W. Barker*	360

GREAT BERKHAMSTED.—For the erection of five residences, North-road and Charles-street, for Mr. William Dwight. Mr. Charles H. Rew, architect, Berkhamsted :—

C. Brightman	£4,075	Honour & Son	£3,497
T. Tirrell	3,950	Jones & Sons, Berkhamsted*	3,305
H. & J. Matthews	3,895		
Nash, Young, & Horne	3,866		

[Architect's estimate, £3,300.]

GREAT YARMOUTH.—For the supply of hardwood road paving blocks for the Town Council. Mr. J. W. Cockrill, C.E., Borough Surveyor, Great Yarmouth :—

For Jarrah Wood.

	Price per 1,000. £ s. d.
Acme Wood Flooring Co., Ltd.	12 2 3
Burt, Boulton, & Haywood, Ltd.	11 3 9
W. Griffiths & Co., Ltd.	11 0 0
Chateau & Co.	10 10 0
M. Butcher	10 10 0
Jarrah Timber and Wood Paving Corporation, Ltd.	10 10 0
M. C. Davies Karri and Jarrah Co., Ltd	10 9 9
Millar's Karri and Jarrah Forests, Ltd.	10 8 5
Graham & Co.*	9 17 6
Millar's Karri and Jarrah Forests, Ltd., 3 in. by 7 in. by 4 in.	7 19 7
Millar's Karri and Jarrah Forests, Ltd., 3 in. by 6 in. by 4 in.	6 16 9

For Red Gum Wood.

Hemingway, Thomas, & Pierce	10 0 0
M. Butcher	9 10 6
E. Alcott	9 10 0
Acme Wood Flooring Co., Ltd.	9 0 0

GREAT YARMOUTH.—For the supply of granite setts for tramways, for the Town Council. Mr. J. W. Cockrill, C.E., Borough Surveyor, Great Yarmouth :—

	Price per ton. £ s. d.
Sanitary Pavement Co., London, S.W.‡	3 1 9
T. Moy	1 19 2
Do.	1 15 3
United Newry Granite Co.	1 15 0
London Basalt Stone Co., Ltd.	1 15 0
Macleod Edwards	1 14 8
Richfeldt & Co.	1 13 9
Rowley Regis Granite Co., Ltd.	1 13 6
Dickson & East	1 13 6
Griffiths & Co.	1 13 0
R. Tate	1 13 0
J. Ross	1 12 9
Brooks, Ltd.	1 12 3
H. Cooper	1 11 9
M. Butcher	1 11 6
Illingworth	1 11 6
Sommerfield & Mead	1 11 6
Burgess, Burgess, & Co.	1 11 0
Watson & Co.	1 10 0
Manuelle (Aberdeen stone)	1 10 0
M. Butcher (Norway stone)	1 9 6
Manuelle (Norway stone)	1 9 0
Skjelsbos Stonhaygen	1 9 0
Van Praagh & Co.	1 7 11
J. Brunton	1 7 9
A. Brunton, Hull*	1 5 6

‡ Accepted for 700 yards.

GREAT YARMOUTH.—For the supply of Portland cement in connexion with tramway works, for the Town Council. Mr. J. W. Cockrill, C.E., Borough Surveyor, Great Yarmouth :—

	Price per ton. £ s. d.
Earl & Son	2 18 4
Do.	2 11 0
Burstall & Co.	1 19 0
Forder & Son	1 19 0
Barton Cement Co.	1 17 0
Coles, Shadbolt, & Co.	1 17 4
J. Brunton	1 16 0
Sommerfield & Mead	1 16 0
Sussex Portland Cement Co.	1 16 0
Bishop, Pratt, & Co.	1 15 0
Saxon Cement Co.	1 14 8
East Anglian Cement Co.	1 13 6
McEuen & Co.	1 13 3
Henthorne & Co.	1 13 0
Kaltenbach & Schmitz	1 13 0
Garson Blake	1 12 10
Macleod, Edwards, & Co.	1 12 9
Pattrick	1 12 6
De Wolf	1 12 6
Smeed, Dean, & Co.	1 12 6
Brunton & Son	1 12 3
Tolhurst & Son	1 12 0
Shackleton & Son	1 11 6
Trechmann Weekes	1 11 6
Associated Portland Cement Co.*	1 11 6
Louis Volkverts	1 11 0
E. J. & W. Goldsmith	1 10 9
Formbys Cement Co.	1 10 5
Dawber	1 10 0
Furness	1 10 0
Peters Bros.	1 10 0
Worcester Cement Co.	1 10 0
Duckett & Son	1 9 6
Jacobs Bros.	1 6 0

GREAT YARMOUTH.—For the erection of cemetery chapel, superintendent's house, &c., Caister, for the Town Council. Mr. J. W. Cockrill, C.E., Borough Surveyor, Great Yarmouth. Quantities by the Borough Surveyor :—

Eastoe	£1,987 0	Bray	£1,788 0
Potter	1,925 0	Grimble	1,760 0
Gunns	1,907 10	Harman	1,754 0
Cafley	1,898 0	Balls	1,742 0
Carter & Wright	1,866 0	Wright	1,740 0
Banyard	1,825 0	Beech, Hemsby, Norfolk*	1,704 0
Smith	1,816 10		

[*See also next page.*

HASTINGS.—For laying sewers, &c., Hollington-lane, for the Corporation. Mr. P. H. Palmer, Borough Engineer, Town Hall, Hastings :—

C. Marchant, Hastings*	£308 18 7

LEICESTER.—For the erection of a warehouse, Charles-street, for Messrs. Davies & Co., Limited. Mr. Chas. Kempson, architect, Corporation-buildings, Leicester. Quantities by the architect :—

Herbert & Sons	£3,623 0 0	F. Elliott	£3,314 0 0
T. R. Tebbatt	3,483 0 0	W. Haddon	3,314 0 0
Bentley & Co.	3,400 0 0	Mason & Son	3,245 7 0
H. Bland	3,377 0 0	Bradshaw Bros.	3,245 0 0
F. Rudkin	3,366 14 6	J. H. Clayton	3,241 0 0
Clarke & Garratt	3,330 0 0	Beck & Co.*	3,221 0 0

[All of Leicester].

LONDON.—For alterations and additions to Charing Cross Hospital. Mr. A. Saxon Snell, architect. Quantities by Messrs. Northcroft, Son, & Neighbour :—

Howard & Co.	£92,772	Trollope & Sons	£86,470
Patman & Fotheringham	89,300	Higgs & Hill	85,844
Bywaters & Sons	87,500	B. E. Nightingale	85,767
H. Lovatt	87,000	Holloway Bros., Lambeth*	82,730
Spencer, Santo, & Co.	86,775		

LONDON.—For additions to the North-East London Institute, Dalston-lane, N.E. Mr. A. W. Cooksey, architect, 4, Adam-street, Adelphi, W.C. :—

Foster Bros.	£12,378	Davis & Leamy	£10,985
Pollard & Brand	12,270	W. Shurmur	10,980
H. H. Hollingsworth	11,933	Sabey & Son	10,895
B. E. Nightingale	11,695	Kilby & Gayford	10,840
Perry Bros.	11,657	G. Parker	10,830
Josolyne & Young	11,350	Chessum & Sons, Bow*	10,826
H. L. Holloway	11,072	J. Appleby	10,790
Roome & Co.	11,067		
W. Wallis	10,997		

LONDON.—For fitting up new premises, 41, 42, and 43, Grand Parade, Harringay, for Messrs. W. Thomas & Co. :—

Cadman & Son	£1,070	Jewuck & Crocker	£744
Marchant & Hirst*	998		

NEWQUAY (Cornwall).—For the erection of new infant school buildings, alterations and additions to existing girls' school, &c., for the St. Columb Minor School Board. Messrs. Cowell & Cowell, architects, Central Chambers, Newquay :—

C. Carrwick	£3,975	W. S. Tippett	£2,630
Cocking & Jenkin	2,863	Trehane & Sont	2,600
Hobbs & Son	2,800		

PORTSMOUTH.—For additions to schools, Church-street, Landport, for the School Board. Mr. A. H. Bone, architect, Cambridge Junction, Portsmouth :—

Clark & Son	£3,700 0	H. Jones	£3,176 0
M. Coltherup	3,515 0	J. W. Perkins	3,149 0
W. W. Learmouth	3,509 12	C. M. Dash	3,089 0
H. H. Hall	3,449 0	J. Crockerell, Southsea*	2,977 0
S. Salter	3,288 0		
W. T. Dugan	3,201 19		

SILLOTH (Cumberland). — For additions to cocoa house, for Silloth Cocoa House Company. Mr. G. Armstrong, architect, 24, Bank-street, Carlisle :—

Building.—W. Leighton, Carlisle*	£188	4	0
Joinery.—J. R. Thomson, Silloth*	175	5	0
Slating.—F. Hart, Carlisle*	19	5	0
Plastering.—Johnston Bros., Silloth*	58	17	6
Painting.—T. Mackay, Silloth*	24	10	0

SOUTH SHIELDS.—For the erection of a dwelling-house for Mr. R. Brown at Westoe. Mr. H. Grieves, architect, Albany-chambers, South Shields :—

W. J. Robertson	£850	0	0
R. Allison	845	0	0
J. Young, Tyne Dock*	843	16	9

STONEHAVEN (N.B.).—For the execution of water supply works, Drumiithie, for the District Committee of the County Council of Kincardineshire. Mr. Jno. Graham, engineer, Stonehaven. Quantities by the engineer :—

W. Roe	£496 0 2	J. Warden	£358 10 0
J. Murray	434 7 5	A. Mathieson, Stonehaven*	357 15 4
J. Ross	415 0 0	R. Mitchell	357 5 8
W. Robertson	388 16 4		
Colin Wood & Co.	364 5 1		

WIMBLEDON.—For the erection of office building, Station Approach, for Messrs. Rickett Smith & Co., Ltd. Mr. A. Broad, George-street, Croydon, architect. Quantities by the architect :—

Somerford & Son	£589	Lorden & Son	£544
Garrett & Son	575	Akers & Co.	496
E. J. Burnand	570	W. Potter, Croydon*	490
D. W. Barker	559		

WOODFORD (Essex).—For the execution of sewerage works, Snakes-lane, for the Urban District Council. Mr. Wm. Farrington, Surveyor, Council Offices, Woodford Green :—

W. & C. French, Buckhurst Hill*	£141 2 4

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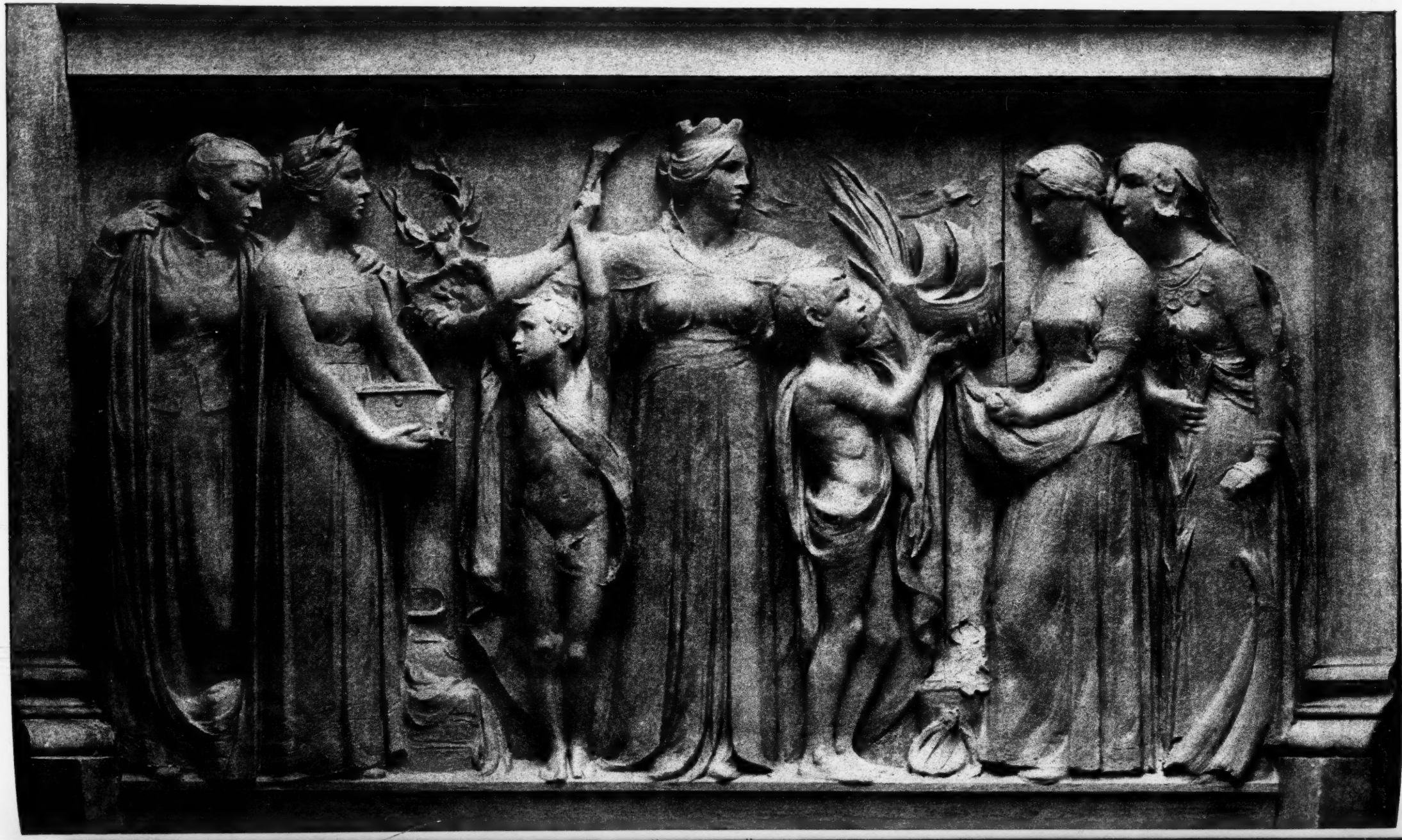

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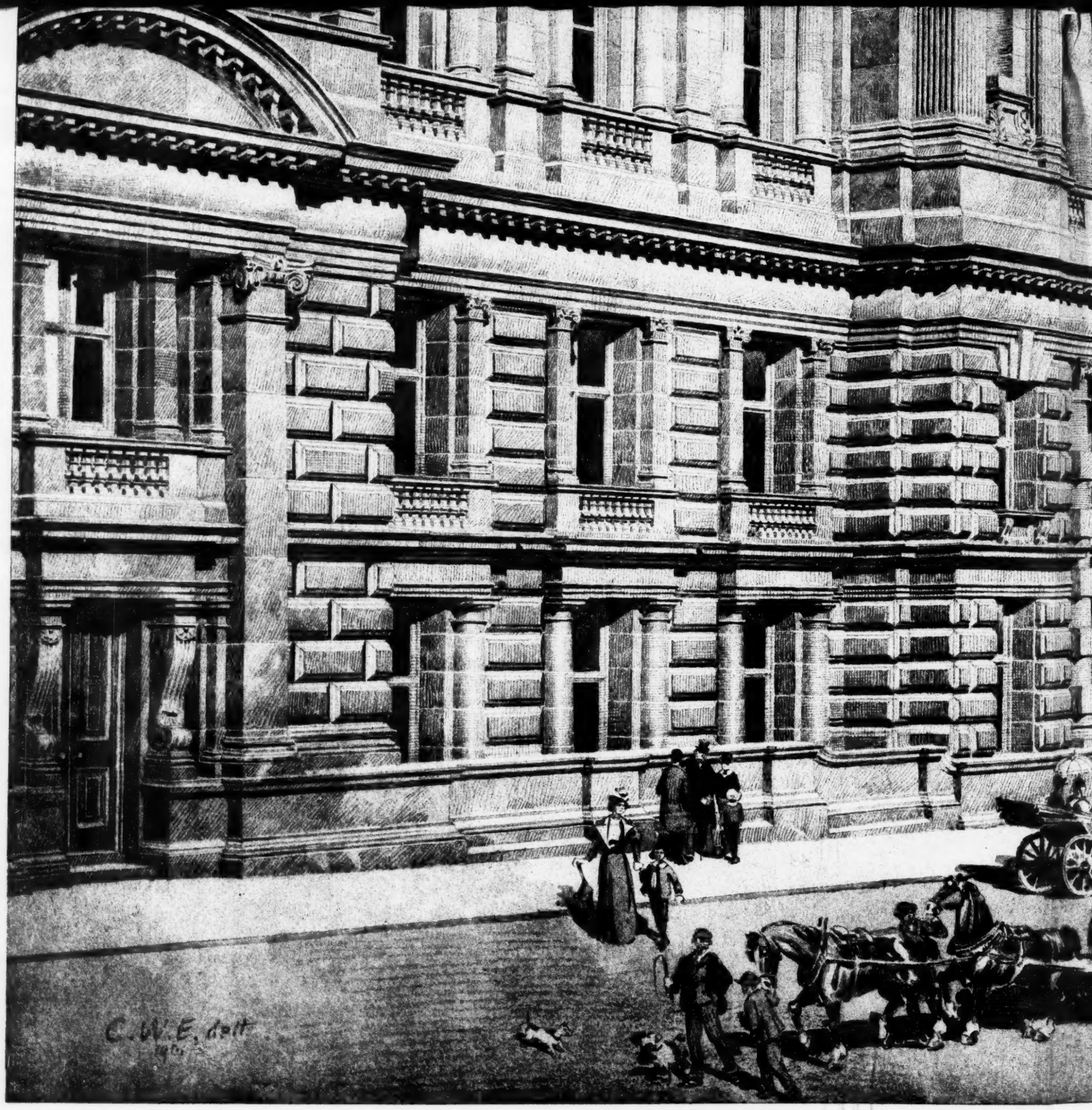
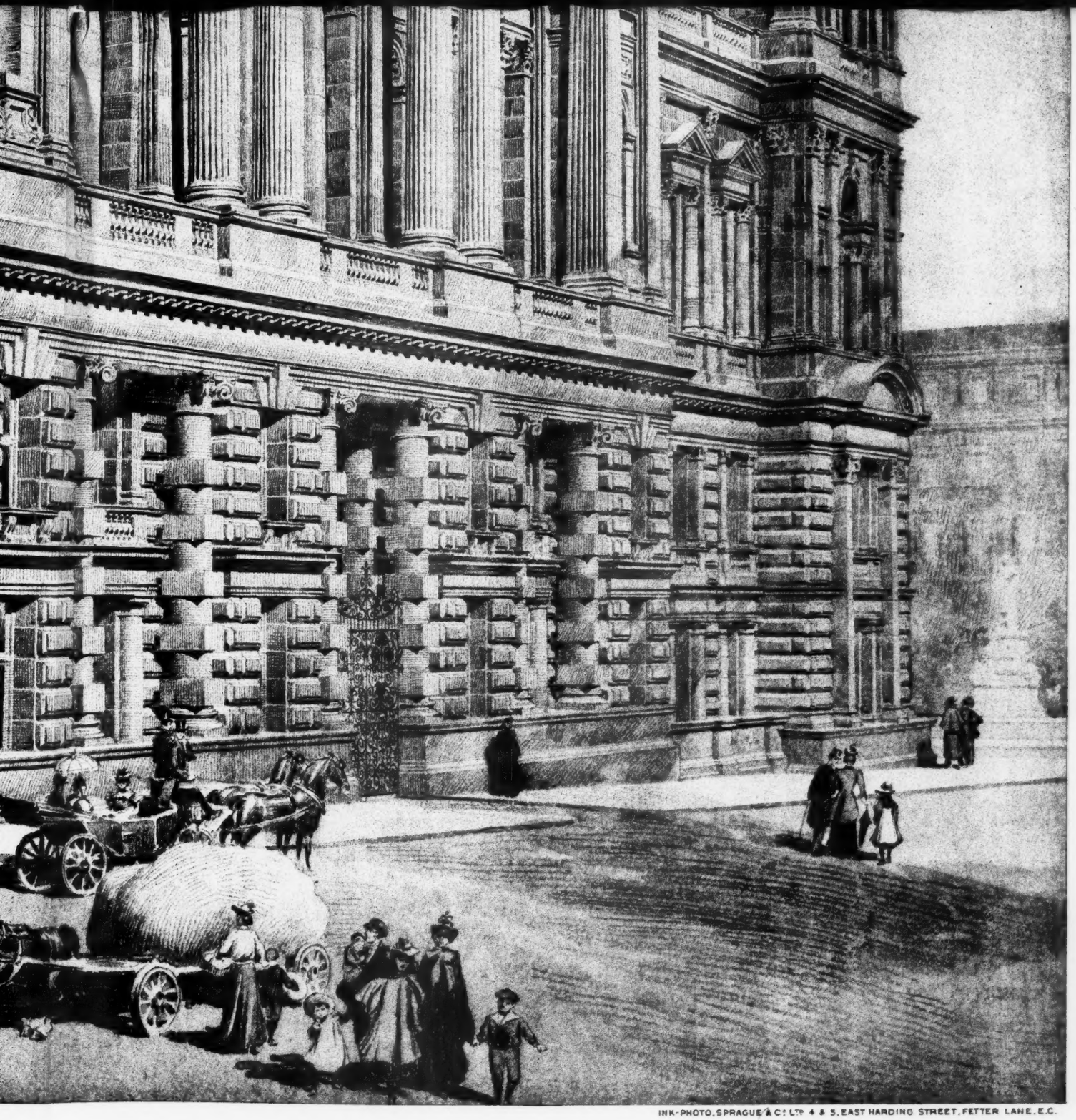


VIEW OF GLASGOW MUNICIPAL BUILDINGS: JOHN STREET FR



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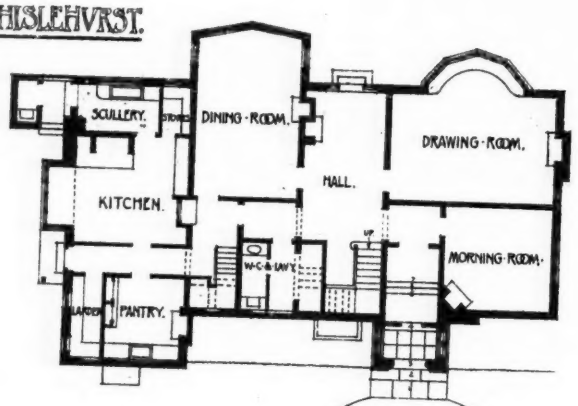
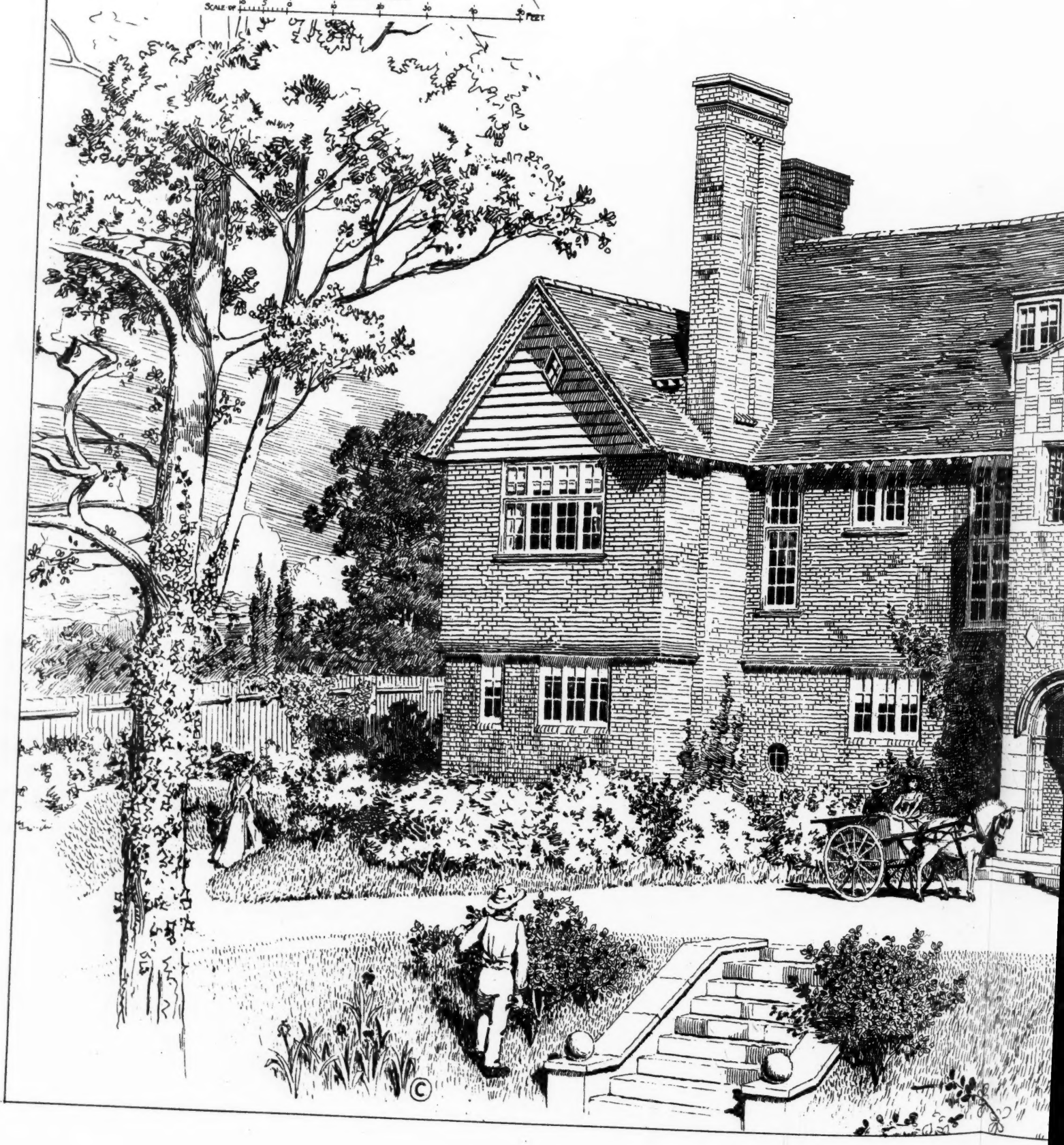
TREET FRONT.—The late Mr. William Young, F.R.I.B.A., Architect.

HOUSE AT CHISLEHURST.

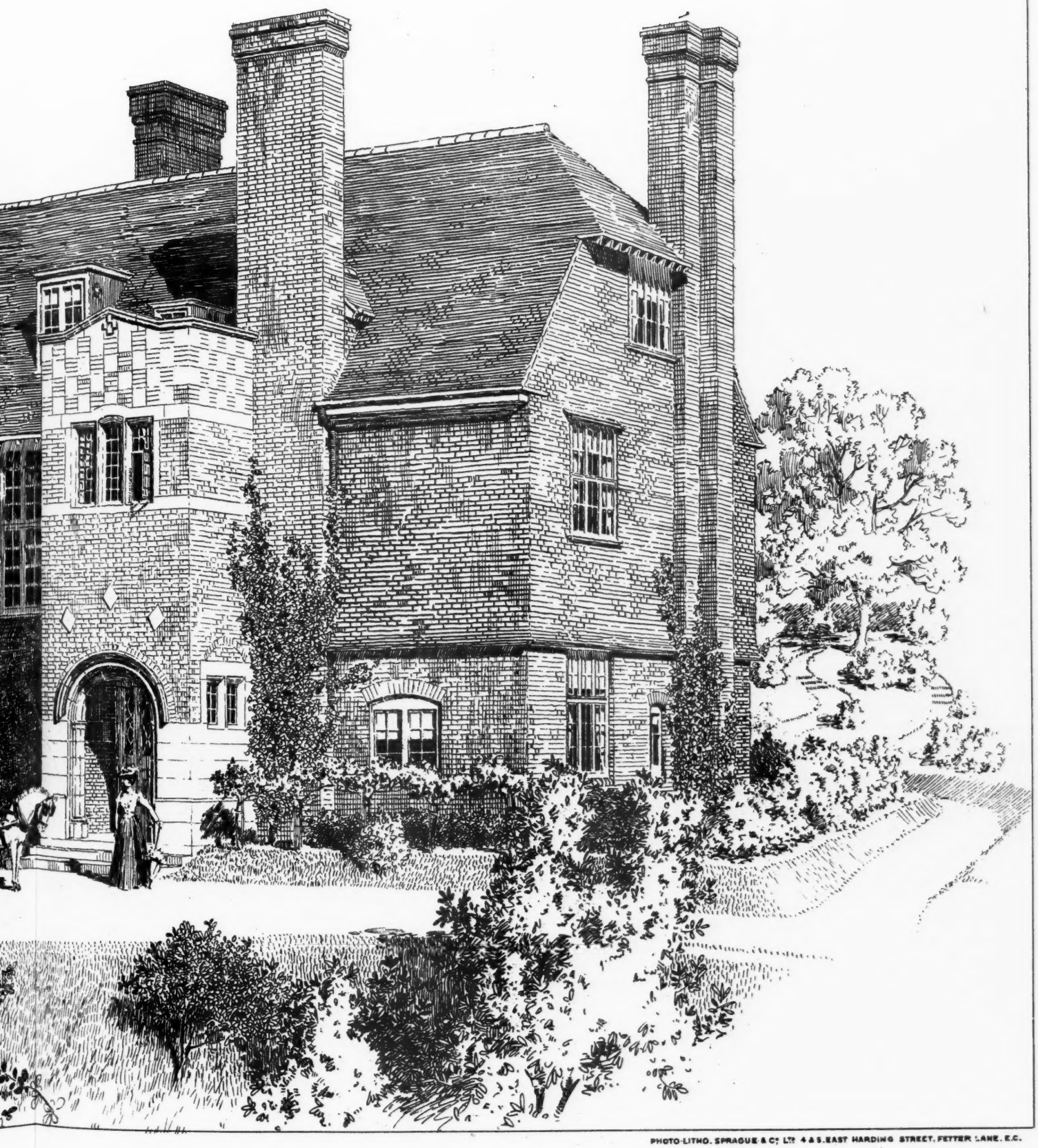


GROUND PLAN.

SCALE OF FEET.



HOUSE AT CHISLEHURST: ENTRANCE FRONT.



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RANCE FRONT.—Mr. Ernest Newton, Architect.